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ART. LXIV.—OBSERVATIONS ON COPAIBA.

By William Procter, Jr.

Copaiba as a drug, under the name of Balsam of Copaiva, has been known and written about for more than two hundred years, and its valuable remedial powers have attracted and received the deliberate attention of physicians, pharmaceutists, and chemists, for many years past.

The genus Copaifera is an extensive one; its species though occurring most largely in the forests of Northern and Eastern Brazil, are found in those of Guiana, Venezuela, and in some of the West India Islands. As yet no writer has described accurately the botanical sources of the several kinds of copaiba found in commerce, nor have travellers satisfactorily ascertained whether each of these is invariably the product of a single species of Copaifera, or whether they are sometimes the mixed products of several species growing together in the region of collection. "According to Hayne, the species from which most of the copaiba of commerce is derived is the C. multijuga, growing in the province of Parà." (U. S. Disp.) But the C. Martii of Hayne, and perhaps other species, grow in that neighborhood, and may contribute to the Pará balsam. The copaiba derived from the vicinity of Rio Janeiro is attributed to C. Langs-

dorffii and C. coriacea, but the sources of the Angostura, Maracaibo, and West Indian drugs are quite uncertain, although attributed to C. officinalis. It is to be regretted that so accurate an observer as Dr. Weddell, did not investigate the Copaiferas, whilst a sojourner in South America.

The extensive demand for copaiba has caused it to be sought in various localities, and from numerous species; and it is probable that climate, and the modes of extraction and preservation, taken in connection with its variable botanical origin, may be referred to as the most prominent and active causes of the remarkable variations in the sensible properties and chemical constitution of the drug itself. It is with a view of throwing some additional light on this subject that the writer has hazarded an opinion in relation to the collection of some specimens of the drug, found in commerce of late years, which he has not as yet been able to verify or disprove, by information obtained from their geographical sources, but which is based on observations made on the effects of age and exposure on copaiba, and its volatile oil.

In approaching the subject, it will be viewed 1st, in reference to the proximate constituents of copaiba. 2d. The proportional relation of these in the copaibas of commerce. 3d. The causes existing and acting, before and after the juice is extracted, which modify the quantitative relation of its constituents. And lastly, conclusions.

1st. The proximate constituents of copaiba, from whatever source, are volatile oil and resin, with a minute portion of some soluble organic acid (probably the acetic or succinic) and in some instances fatty matter.

The *volatile oil of copaiba* is constituted much like that of turpentine. Its equivalent is C_{10} H_8 which makes it isomeric with the oil of lemons, and just one half of that of oil of turpentine. It forms a crystalline artificial camphor with hydrochloric acid gas, which differs from those of the oils of turpentine and lemons. Its specific gravity is .878;

it boils at 473° F. but undergoes a slight alteration unless oxygen is excluded ; it is very soluble in anhydrous alcohol, but much less so in that of officinal strength (.835). It is the cause of the peculiar penetrating odor of copaiba, and has a biting extremely disagreeable persistent taste. Durand first ascertained it to be a hydro-carbon by noticing its indifference towards potassium, which keeps well in it. It is gradually resinified by exposure to the air.

The resinous portion of copaiba consists of two distinct substances : one of these is a strong resinous acid to which the name of *copaivic acid* has been given. The other is neutral, incapable of uniting with bases, has a permanently soft consistence, is soluble in anhydrous alcohol and ether, and insoluble in weak alcohol, and mineral naphtha.

Copaivic acid is inodorous, nearly insipid, soluble in ether, alcohol, and the volatile oils, and its alcoholic solution reddens litmus paper. It forms combinations with bases which are generally soluble in ether and alcohol. It has the same ultimate composition as colophony, the resin of European turpentine, C_{40} H_{32} O^4. It is usually amorphous like ordinary resin, but Schweitzer has obtained it in colorless crystals. Its salt of magnesia is the basis of the officinal copaiba pills.

2d. Let us now examine the proportional relations of these constituents as they occur in the copaibas of commerce.

According to the analysis of Stoltze copaiba contains 38. of volatile oil, 52.75 copaivic acid, 1.66 soft resin, 7.59 water and loss.

Gerber's analysis of fresh copaiba gives 41. volatile oil, 51.38 copaivic acid, 2.18 soft resin, 5.44 water and loss.

Gerber's analysis of old copaiba gives 31.7 volatile oil, 53.68 copaivic acid, 11.15 soft resin, 4.1 water and loss.

Durand found 50 of volatile oil and 50 of resin, including a little fatty matter, acetic acid and perhaps water, without isolating the copaivic acid.

According to Guibourt, copaiba yields 45 volatile oil, and the resinous residue consists of 98 parts of copaivic acid and 2 parts soft resin.

Mr. Whipple (Pereira) obtained 48 per cent of resin and 52 per cent of volatile oil.

In addition to the above I have examined five specimens of copaiba obtained at different times in the Philadelphia market, and also a sample of oil of copaiba which had been kept long in a bottle imperfectly stopped until it became slightly resinous and more viscid than copaiba itself. As a means of distinguishing them I will attach the letters of the alphabet. The method adopted to ascertain the amount of oil and resin was to place a weighed quantity, say 100 grains, of the specimen in a small weighed capsule and expose it to a regular heat at about 250° F. until the oil was evaporated and it ceased to lose weight. The capsule was then weighed and the loss ascertained. Although this method of analysis is not so accurate as distillation with water, using a larger quantity, and weighing the distilled oil and the residue resin separately, yet it is sufficiently precise to answer the object of the writer.

(*a.*) This specimen was remarkable for being very slightly resinous. Its specific gravity was only .916; its odor purely that of copaiba ; it was light straw colored, very fluid, and consisted of 80 parts of volatile oil, and 20 parts of resin. The latter was soft, adhered to the fingers, and was slightly acid to litmus when dissolved in alcohol. The origin of this specimen is uncertain, but it is believed to be from Parà. Sixty grains of it was heated several minutes with one-sixteenth of recently calcined magnesia, and set aside twenty-four hours. No combination ensued : the magnesia settled to the bottom, the copaiba remaining transparent above it.

(*b.*) Origin unknown, consistence rather thin, odor good color brownish yellow, and sp. grav. .956. It consisted of 65 parts volatile oil, and 35 of resin ; when heated

with one-sixteenth of magnesia and set aside 24 hours only partial union followed, a part of the magnesia precipitated, and a part was taken up by the oleo-resin, which remained turbid.

(*c.*) This specimen has a thick consistence, its sp. grav. .983, is several years old, but its origin is not known, although it looks like that from Angostura. It consists of 50 parts of volatile oil, and 50 parts of resin. The resin is pulverizable, and quite acid to litmus when dissolved in alcohol. Heated with one-sixteenth of magnesia, it became tolerably consistent on cooling, but did not acquire a pillular consistence after 36 hours.

(*d.*) This sample obtained as Angostura copaiba, has a density of .985, is transparent, has a light brown color, correct odor, and thick consistence. It consisted of 35 parts of oil and 65 of resin. The resin was not fragile and pulverizable, but soft and sticky between the fingers. Heated with one-sixteenth of magnesia, it acquired on cooling, a thick consistence, and at the expiration of 36 hours its consistence was firmer than that of *c*. The resin was quite acid to litmus.

(*e.*) This specimen has been in my possession several years, it was obtained as "solidifiable balsam," but its origin is unknown. Its color dark yellowish brown, consistence thicker, its odor more aromatic than either of the preceding, and its density .986. It consisted of 34 parts of volatile oil and 66 parts of resin, the alcoholic solution of which was strongly acid to litmus paper. When heated with one-sixteenth of magnesia, its consistence was almost pillular on cooling, and after 24 hours was fit for use.

(*f.*) This specimen was oil of copaiba obtained by distillation, that had been kept five years in a cracked bottle, so as to admit the air. Its consistence is thicker than either of the preceding copaibas, has a bright amber color, is perfectly transparent, readily soluble in commercial alcohol, and its solution hardly reddens litmus paper. It consists of volatile oil 66, soft resin 34.

When mixed with one-sixteenth of magnesia and allowed to stand five days, no combination ensued; it was then heated, with no increase of solidity, except what might be attributed to loss of oil; in other words, though thick and resinous, it is not solidifiable, because it contains no copaivic acid.

The following table exhibits these results at one view.

	Stoltze	Gerbers fresh copaiba	Gerbers old copaiba	Durand	Gulbourt	Wipple	*a*	*b*	*c*	*d*	*e*	*f*
Volatile oil.	38.	41.	31.7	50	45.	48.	80	65	50	35	34	66
Copaivic acid.	52.75	51.38	53.68	50.	53.9	52	20	35	50	65	66	
Soft resin.	1 66	2.18	11.15		1.1							34
Water & loss.	7.59	5.44	4.10									

By a comparison of these results, we are first struck with the great variation in the proportion of volatile oil, which varies from 31 to 80 per cent. Second: in the three first and the fifth analyses, the ratio of copaivic acid is nearly equal, while the soft resin varies from 1.66 to 11.15 per cent., being greatest in the oldest. Third: that only three specimens, containing from 50 to 60 per cent. of resin will solidify. Fourth: that the resin in the specimen *a* differs from all the rest both in color, consistence, and want of acidity, the copaiba being apparently immature; and lastly that in the spontaneous oxidation of copaiba and its volatile oil, it is the soft resin only that is formed.

3d. The causes modifying the proximate constitution of copaiba, existing and acting before and after the extraction of the juice, are several.

It is an ascertained fact that the ascending juices of plants, particularly of trees, are much more simple than those which descend, after having passed the circulation of the leaves; and the principles deposited by the downward current contain more carbon and less oxygen, than those contained in the ascending current. This arises from the chemical changes going on in the leaves during the action of light on them, by which oxygen is evolved from the carbonic acid and other constituents of the juices. "Their green

leaves absorb the chemical rays of the sun so completely as to give no image in the daguerreotype." (*Graham.*) This deoxidizing and carbon-depositing action appears to go on to a much greater extent in oleiferous and resiniferous plants than in others.

Now it appears from observations made by different observers, that as the copaiba trees get older, their juices become more oleo-resinous, that is to say, the process of oxidation to which the volatile oil is subjected, causes it to become more resinous, year after year; and it is only after a certain age, that, in the opinion of the copaiba collectors, the trees are fit to be tapped. The analysis of Rose proves that copaivic acid is the oxide of the oil of copaiba; thus the formula of the acid is C^{40} H^{32} O^4 whilst that of the oil is C^{10} H^8, which quadrupled=C^{40} H^{32}, and this plus O^4=the formula of the acid.

Again; as the juices of the older trees are more resinous, the juices of the younger trees are more oily and less resinous, and beyond doubt there is a period in their growth when the volatile oil is associated with comparatively little resin. Now the writer is willing to hazard the opinion that the specimen of copaiba distinguished by (*a*) in the table was extracted at this period of the growth of the tree, when not only the oil was in great excess, but the resin not completely elaborated, in other words, not converted into copaivic acid. This view is indirectly corroborated by the fact that there are one or two oleo-resins, containing but a trifle of resin, which are obtained by tapping, from trees, growing in Venezuela. One of these, called "native oil of laurel or sassafras," obtained from trees growing on the banks of the Orinoko, about 400 miles from its mouth, is now under examination, and will be noticed in the next number.

The judgments of the medicinal value of copaiba, have generally been based on its consistence and solidifying property. The observations of writers on therapeutics, have shown that early all its peculiar efficacy is due to the volatile oil. If

this is true, and there appears no reason to doubt it, the "solidifiable balsam" is the least valuable as a medicine, and it becomes an important question whether the practice of extracting the juice from the older trees is the most eligible? It is for therapeutists to ascertain whether such copaiba as (*a*) is or is not better than such as (*e*.)

It is apparent from the analyses above detailed, that copaivic acid is a *natural* product formed in the juice of the plant, and not after its extraction, by exposure to the air. The examination of old copaiba by Gerber, and of the specimen (*f*) of old oil of copaiba by the writer, especially show this; hence if any given specimens of the drug be not naturally possessed of about 50 per cent. of copaivic acid, no subsequent oxidation will render it solidifiable.

The soft resin formed by oxidation of the oil appears to give more consistence to the drug weight for weight, than the copaivic acid, probably from being less soluble, and hence old copaiba is not only thicker in consistence from loss of volatile oil, by evaporation, but from the formation of the soft resin. It is highly probable that specimens of copaiba may be met with, which, originally immature, and slightly resinous, have become thick and resinous from exposure. Such copaiba will not solidify, for the causes mentioned. The remarks by Joseph Laidley at page 121 of this volume, tend to corroborate some of the statements in this paper, whilst these explain the difficulties met with by that writer.

ART. LXV.—ON SOME PHARMACEUTICAL PREPARATIONS OF MANGANESE.

By William Procter, Jr.

Within a short period the attention of medical men has been attracted to the salts of manganese as remedial agents, chiefly through the published views of M. Hannon, contained in the *Revue Medico-Chirurgicale de Paris* for June 1849, where an account of several pharmaceutical preparations of the metal may be found. The American Journal of the Medical Sciences for January and April of the present year contains a translation of M. Hannon's observations, but as the author assumes that the apothecary is provided with pure sulphate of manganese, from which to make the other salts he describes, and does not give very eligible processes for several of the preparations recommended, it will be better to begin at the native black oxide, which is cheap and readily obtainable from the druggists, and describe the most convenient processes for obtaining the salts. The quantities mentioned are purposely small to suit those pharmaceutists who may incline to supply themselves.

Carbonate of Manganese. Take a pound of black oxide of manganese, of good quality, in fine powder, put it in a porcelain or stone ware dish, placed on a sand bath, or other source of heat, pour on it two pints of common muriatic acid, and stir them well. Chlorine gas is evolved, which should be avoided by the operator, by performing the operation under a chimney, or furnace hood, or in the open air. Muriatic acid should be added from time to time, until all is dissolved, but the earthy impurities. The solution of chloride of manganese, thus obtained, contains free muriatic acid and sesquichloride of iron, to get rid of which, proceed as follows. Make a strong solution of carbonate of soda, add it gradually to the solution of manganese until the excess of acid is neutralized; the carbonate of manganese at first thrown down being redissolved,

then heat the solution to ebullition, and pour in the solution of carbonate of soda from time to time, boiling after each addition, until the carbonate of manganese which it precipitates is free from sesquioxide of iron. This is easily ascertained by filtering off a few drops of the boiling solution, and adding to it a solution of yellow prussiate of potassa. If all the iron is separated, a white precipitate is produced, but if some yet remains, it will have a tinge of blue more or less deep, and of course more carbonate of soda should be added till the iron is all separated.

Filter the solution from the oxide of iron, and add to it an excess of carbonate of soda; a bulky white hydrated carbonate of manganese precipitates, which should be washed with cold boiled water, and thrown on a cloth to drain. It is now ready for the preparation of any of the soluble salts of manganese by solution with their respective acids, as the sulphate, chloride, malate, tartrate, acetate, etc.

Carbonate of manganese is a white or pale rose colored powder, insoluble in water, and when heated much above 100 F. is changed by its base passing to a higher degree of oxidation. It consists of two equivalents of protoxide of manganese, two equivalents of carbonic acid, and one equivalent of water. For medical purposes it may be used in three forms, viz.:

1st. *Pure* in powder obtained by drying the moist carbonate above described at a temperature below 100° F. in a drying room or by spontaneous evaporation. It may be given in pills, powders, or mixed with syrup or mucilage.

2nd. *In powder united with sugar*, prepared by mixing the moist washed and pressed carbonate, obtained by precipitating ten ounces sulphate of manganese with an excess of carbonate of soda, with four ounces of sugar in powder, and evaporating the moisture from the mixture on a water bath at a temperature not exceeding 130° F. till it is dry. This which may be called the *saccharine* carbonate of man-

ganese is then reduced to powder and preserved for use. It consists of about two parts of carbonate to one of sugar, the object of which is to preserve it from oxidation. It may be given in powder, pills, or mixture, as the prescriber may desire.

3rd. *Combined with honey,* in a pillular form like Vallet's carbonate of iron as recommended by M. Hannon, who gives the following formula. "Dissolve seventeen ounces of crystallized sulphate of manganese, and nineteen ounces of carbonate of soda, each in two pints of water containing two fluid ounces of syrup; mix the solutions thoroughly, and suffer the precipitate to subside in a well stopped bottle. The supernatant liquid is decanted off, the precipitate washed with sweetened water and thrown on a cloth saturated with simple syrup to drain. It is then expressed, mixed with ten ounces of honey, and rapidly evaporated, (the access of air being prevented) to a proper consistence for making pills. The sugar and honey prevent the oxide of manganese from super oxidation. The dose is from four to ten pills, each four grains, every day, in chlorotic cases where iron has not succeeded. The hyperoxidation of carbonate of manganese may be prevented by adding freshly prepared vegetable charcoal to the pills."

Sulphate of manganese. On a small scale, pure sulphate of manganese may be prepared thus:—

Take four ounces of sulphuric acid, mix it with twelve fluid ounces of water, and add moist hydrated carbonate of manganese, gradually, until the acid is saturated. Filter the solution, which has a light amethist color, evaporate it at a moderate temperature, till a crystalline pellicle commences to form, then set it aside in a drying closet, or for spontaneous evaporation. If an attempt is made to hurry the evaporation by ebullition a sub-hydrated sulphate is thrown down in fine powder.

On a larger scale this salt may be prepared directly from the native oxide, by mixing ten pounds of the black oxide

intimately with one pound of finely powdered bituminous coal, and heating the mixture in a covered iron or earthen crucible for half an hour at a red heat. The presence of the carbonaceous matter at the high temperature, reduces the manganese to the state of protoxide. When cold, the mass is reduced to powder, and treated with ten pound of sulphuric acid diluted with three gallons of water till the oxide is dissolved out. One-sixth of the filtered solution is precipitated with carbonate of soda, the impure carbonate of manganese washed with water, added to the remainder of the solution, and boiled until ferrocyanuret of potassium ceases to cause a blue precipitate when added to a drop of it. The liquid is then filtered, evaporated, till a pellicle commences to form, at a gentle heat, and set aside to evaporate spontaneously in shallow vessels.

Sulphate of manganese is white, or slightly amthiest-colored, has a styptic taste, crystallizes in rhomboidal prisms, and is soluble in two and a half parts of cold water, and more soluble in boiling water. It is insoluble in alcohol, and an easy way to isolate the sulphate from its solution on a small scale, is to add to a saturated solution its bulk of alcohol. Its amount of water of crystallization varies. When crystallized at or under 42° F. it contains 7 equivalents of water; between 45° and 68° it contains 5 equivalents of water; from 68° to 86°, it has but 4 equivalents of water. (*Graham.*)

Syrup of Iodide of Manganese.—M. Hannon has given a formula for syrup of iodide of manganese, in which he directs a drachm of carbonate of manganese to be dissolved in sufficient liquid, hydriodic acid, and the solution added to seventeen ounces of syrup of guaiacum and sarsaparilla; but this proportion is too weak, and besides is objectionable, on account of the menstruum, in certain cases. The following process gives a more concentrated solution in simple syrup, pure, with the exception of a small quantity of sulphate of potassa, which is inert.

Take of Crystallised sulphate of manganese, 16 drachms.
Iodide of potassium, 19 "
Sugar, and water, each a sufficient quantity.

Dissolve the sulphate of manganese and iodide of potassium each in three fluid ounces of cold water, containing two drachms of syrup, and mix them in a glass stopped bottle, and after the crystals of sulphate of potash cease to precipitate, throw the solution on a filter of fine muslin, and allow it to pass into a pint bottle containing twelve ounces of powdered sugar. When the solution has ceased to pass, wash the filter with a little water, and then add sufficient of that fluid to make the whole measure one pint. Finally agitate the bottle until the sugar is all dissolved. This preparation contains about one drachm of solid iodide of manganese to each fluid ounce, which is the strength of the officinal solution of iodide of iron.

The dose varies from ten drops to half a fluid drachm.

Pills of Iodide of Manganese.—M. Hannon recommends these to be made by mixing equal quantities of iodide of potassium, and dried sulphate of manganese, and forming a mass with honey, which should be divided into pills, each containing four grains. They should be kept in a well stopped bottle. The dose is one pill daily, gradually increased every three days to six pills. They are then omitted eight days, after which their use is resumed.

Phosphate of Manganese.

Take of Sulphate of manganese, four ounces.
Phosphate of soda, five ounces.
Water, a sufficient quantity.

Dissolve the sulphate and phosphate severally in two pints of water, mix the solutions, wash the precipitated phosphate, till the sulphate of soda is removed, press it between the folds of bibulous paper, and dry it at a moderate temperature.

Phosphate of manganese is a white, nearly insoluble powder. M. Hannon gives formulæ for pills, syrup and

lozenges. The pills contain each three grains of phosphate and one of Peruvian bark, made into form with syrup of catechu.

Malate of Manganese is recommended as one of the best preparations of this metal for medical use. It is made by saturating a solution of malic acid with carbonate of manganese. The scarcity of the acid renders this salt too expensive for general use; but should it really merit the preference to others more readily attainable, and be in demand, the following is, perhaps, the most eligible process. The malic acid is derived from sumac berries (Rhus glabrum) as recommended by Prof. W. B. Rogers (Amer. Jour. Pharm., vol. 7 p. 56;) the red exterior coating of which contains a considerable amount of bi-malate of lime.

The berries, deprived of their supporting peduncles, are infused in boiling water, without bruising, until the acid salt is dissolved out. The infusion is filtered through cotton flannel, evaporated to a syrupy consistence, and set aside to crystallize. The bi-malate of lime readily separates in regular crystals: these are drained, dissolved in a small quantity of boiling water, and again crystallized by cooling. The bi-malate is redissolved in the smallest possible quantity of boiling water, and diluted sulphuric acid dropped in carefully, until it ceases to produce a precipitate. Allow the solution of malic acid to cool, separate the precipitated sulphate of lime by a filter, and wash out the malic acid which adheres to it with a little water. Lastly, saturate the solution of malic acid with carbonate of manganese, filter and evaporate carefully by a water bath.

M. Hannon recommends malate of manganese in the forms of syrup, pills, and lozenges. The syrup is made by dissolving one ounce of the salt in a pint of simple syrup. He also remarks, that "the preparations of manganese have this immense advantage over those of iron, that they can be combined with vegetable tonics and astringents, viz: tannin, and the substances which contain it; as gall-nuts, rhatany, catechu, dragon's blood, kino, monesia, cinnamon,

and cinchona. These can all be combined with malate of manganese."

"In cases where iron has not succeeded, it is desirable not to make a sudden transition to manganese, but to combine the two remedies, as in the following formula. Pure crystallized sulphate of iron, 13 ounces; pure sulphate of manganese, 3½ ounces; pure carbonate of soda, 17½ ounces; honey, 10 ounces; syrup, as much as may be sufficient to make a mass, to be divided into four grain pills. Dose, from two to ten pills daily. The insoluble preparations of manganese should be first used as the carbonate, phosphate, and oxide; then the more soluble preparations, the tartrate, malate, &c., may be employed. The use of this medicine should not be persevered in so long as that of iron, as its preparations are more rapidly assimilated."

ART. LXVI.—ON THE CULTIVATION OF WORMSEED, AND ON THE PREPARATION OF ITS OIL, AS CONDUCTED NEAR BALTIMORE.

[The substance of the following remarks was received in a communication from a druggist in Baltimore, with permission to publish any part of it which we might deem useful to our readers. The gentleman, though urged to let his name appear, modestly declines, but we can vouch for his credibility.—EDITOR.]

Oil of Wormseed (Chenopodium anthelminticum) was formerly much more used in this country than it is at present. We believe the disrepute into which it has fallen with physicians has chiefly arisen from the large amount of the oil brought from the Western States, the best of which, although raised from Baltimore seed, possesses much less of the peculiar fragrance and pungency of the Baltimore oil. Some druggists mixed it with the latter, and others sold it as equal in value; but experience has proved them to be in

error. A few druggists, vermifuge venders, and physicians, however, persisted in selling, using, and prescribing the Baltimore article, and it has gradually come into more general use; and vermifuge makers, knowing its value, use it exclusively.

The soil in this vicinity appears to be particularly adapted to the developement of the activity and value of the wormseed plant. About twenty or thirty miles north of Baltimore, some fifty or sixty persons grow the plant in small or large patches on their land. Newly cleared ground is said to be most productive. The seed are sown early in the Spring in small beds of good soil, like cabbage seed, and the process of cultivation is similar to that for cabbage. If the season proves favorable, the plants will be ready to set out during the month of June. They are planted in ridges three feet apart, the plants in the rows to be from six to ten inches apart. The succeeding year the roots, which are perennial, will yield another crop more productive in oil than that of the first year, and do not need replanting for four or five years. The plants attain the height of from two to four feet, and are ripe for distillation generally between the first and fifteenth of September, which is known by the tops turning yellow; the stalks are cut from 6 to 10 inches above the ground, in fact all the herbaceous portion. Some seasons the plant yields more oil than others, [a fact equally applicable to all annual volatile oil yielding plants.] An acre produces sufficient to yield twenty pounds of the oil, and as from 50 to 70 pounds of the plant are required to yield one pound of oil, that is from 1½ to 2 per cent., it follows the yield is from a half to three quarters of a ton of the fresh plant per acre. It is distilled after it has been gathered two or three days. The average annual product is about twenty-five hundred pounds of oil. The growers distil the oil themselves. The apparatus now employed by them is the same as that used forty years ago, and consists of an

iron pot of from three to six gallons capacity with a soap stone head or cap, into which a gun-barrel is fitted, which latter is kept cool by a stream of water, and acts as the condenser. The pot is permanently built in brick work so as to form a fireplace beneath. The soap stone capping consists of two pieces; one about four inches thick, and penetrated by a hole eight or ten inches in diameter, is cemented on the top edge of the pot. The gun barrel passes through the side of this stone and opens into the interior. The other soap stone is a circular flat piece lying on the first, completely covering the opening, and forms a steam tight joint, the two being ground to fit accurately. A spot is selected near a running spring, when possible, so as to facilitate the refrigeration. The whole plant is used, which is forced down into the pot until it is full, and then water poured on till the interstitial space is nearly filled, when the cap is replaced and the process commenced. The charge in each five gallon pot yields about one ounce and a quarter of oil, and requires about 20 minutes to distil it. The distillers object to distil the seed tops alone as clogging the still. The oil is brought to market in lots of from half a pound to fifty pounds or more, principally in the fall and along through the winter, some holding on till spring for a better price. The average cost price is from two and a half to three and a half dollars, although some assert that it will not remunerate the producer under four dollars. The oil as obtained from different growers, has generally the same appearence—a pale straw color when recent, whilst Western oil is much darker. The Baltimore oil sometimes has an empyreumatic odor when it has not been prepared with the usual care, [a fact easily accounted for when we consider the apparatus. Indeed it is hardly credible that in view of the easily attainable means of distillation on a large scale, that the old habits of those wormseed oil distillers should be persisted in.—Ed.]

The following receipt for administering oil of wormseed

has been extensively tried, and has proved more effectual than when given alone.

℞	Ol. Chenopodii (Baltimore)	ʒiss.
	Ol. Ricini	℥iij.
	Ol. Anisi	gttx.
	Syrupi Rhei et Sennæ	f℥i.

Mix the three first ingredients, then add the syrup, heat the mixture gently, and agitate it well.

In administering this preparation the vial should oe shaken, a teaspoonful given to a child one year old, two teaspoonsful to one or two or three years old, and so in proportion to age. It should be given at night, and in the morning before breakfast.

ART. LXVII.—ON DISPLACEMENT.

By John Harris, M. D.

May not some of the difficulties in the process of displacement be obviated by a proper use of the stop-cock?

These difficulties arise, for the most part, from improper comminution of the material to be acted upon, and improper packing of it in the displacement cylinder.

If the material, or any large proportion of it, be too finely pulverized, the fluid will pass too slowly, or not at all; if too coarsely, it will pass too rapidly; if unequally, it will form channels through which only it will travel, leaving other portions of the mass untouched.

The same consequences result from too much, too little, or unequal pressure in packing. But, to preserve, in all cases, a proper state of comminution, and proper packing, calls for the exercise of more care, and of more judgment, enlightened by experience, than can generally be expected.

Now, let the material to be acted on, be so coarsely disintegrated and lightly packed as to permit a *sufficient-*

ly rapid passage of the fluid, and all the other inconveniences may, it seems to me, be obviated simply by *regulating the rapidity* of its flow by means of the stop cock. The operator should keep in mind the swelling of the dry materials when penetrated by the menstruum, and guard against the too great compactness which might thus be produced. To this end let the maceration be performed before putting the materials into the displacement vessel.

Be sure that the flow of the fluid from the displacement cylinder is not much more rapid than its subsidence through the most compact part of the mass, and you secure the great object of subjecting every part of the mass to the action of each successive stratum of the fluid.

Lastly, let the flow be by such slow degrees as to give *time* for the solvent action of the fluid, and the great advantages of the process of displacement are attained.

When a fluid of less density is to be displaced by one of greater density, there will be, to a greater or less extent, an admixture of the two: in such a case it would be proper to give more attention to the pulverization and packing of the material.

I do not know that there is any thing of novelty in these suggestions: indeed, I suppose many, like myself, have long employed in practice the principle which they involve. I have nevertheless thought it proper to offer them for consideration.

ART. LXVIII.—FALSIFICATION OF PRECIPITATED CHALK.

By Richard H. Stabler, M. D., of Alexandria, Va.

Having my attention accidentally arrested by a fraudulent substitution for an important article which, if it prevails to any extent, may have an important bearing on the

public health; and not remembering to have seen a notice of it in the Journal of Pharmacy or any other publication connected with our profession, I would direct attention to it.

The article referred to was purchased of a respectable house in New York (whom I believe to be ignorant of the character of it) as precipitated chalk. It was put up in boxes, 36 lbs. each, with no label or brand on the end or sides; has a gritty crystalline feel between the fingers, very different from the genuine article, decidedly saline taste, very white in appearance, exactly resembling a superior precipitated chalk; it does not effervesce in the least with nitre, sulphuric or muriatic acids, previously diluted; when agitated with distilled water, allowed to subside, and the clear liquid decanted into a test glass, the nitrate of baryta gave a copious precipitate, proving conclusively, I think, that the article is pure sulphate of lime—"Plaster of Paris"—instead of Precipitated Chalk.

I send a sample of it, which thou wilt please make such use of as thee may deem best, and if the subject is of sufficient importance in thy estimation, have this letter inserted in the Journal.

Eighth mo. 1*st*, 1850.

[The sample under the microscope presented the characters of a crystalline powder. It may possibly have been the result of accidental carelessness in using sulphate of soda instead of carbonate of soda as the precipitant, but it is more likely to have been design, inasmuch as the manufacturer was ashamed to put his label on the packages. Such conduct should be visited by the severest reprobation of all honest apothecaries and druggists.—Ed.]

ART. LXIX.—NEW PREPARATIONS OF VALERIAN.

By A. K. Gardener, M. D., New York.

The object of this paper is to say a few words in regard to the *Radix Valerianæ*. This plant is indigenous to Europe, where it is found growing abundantly in the damp woods and meadows, as well as upon the dry and more elevated grounds. But though it is found growing naturally all over the Continent, it does not seem to arrive to such perfection as in England. And it is from thence that our supply is principally obtained. Holland produces a little, which is occasionally seen in our market. There is, however, a very marked difference in the appearance of the roots of these two varieties. The Dutch is much smaller, shrivelled and stunted in its appearance; of a much darker color, and possessing far less of the peculiar smell which characterizes this plant. It has always been considered as possessing less virtues than the English.

Within a very short time—possibly three years—a very limited supply of still a third variety, has been offered in our markets. This may be called the American. Valerian is not a native of this country, as has been stated. Its presence, therefore, deserves some explanation. Some years ago, Messrs. Brinley & Co., of Boston, imported some of the living root from England, and placed it in the hands of the Shakers at Enfield, New Hampshire. It is from this germ that the American valerian of our market is produced. Whether from the favorable character of the soil and the climate of this country, or from the care bestowed upon it, by the skilful farmers and agriculturists of this fraternity, I know not, but from either or both, has sprung up valerian far superior in its appearance to the best produced in England. Perhaps the *Valeriana officinalis* is not cultivated in England, and that the difference in its appearance may have arisen solely from the care which has been bestowed upon it. The most careless glance at the two varieties

shows a marked difference, and in favor of the American. The root is clearer, of a more yellow or brown color; the cylindrical fibres are longer, larger in circumference, and freer from knots, and presents none of the knobby, gnarled appearance which characterizes the Dutch, and is more or less observant in the English specimens. In addition to this, the aroma is far more fresh, freer from any musty additions, and in strength is allowed to be certainly as strong, if not superior to the English. So much for the sensible qualities of the American article.

In regard to the medical properties, the superiority which it is shown to possess over the English, is not more apparent than will be seen on comparing their intrinsic virtues.

Valerian is characterized as a mild stimulant, with especial direction to the nervous system, but without narcotic effect. Various diseases have been supposed to have been benefitted by this root, but its use has lately been limited to spasmodic and nervous complaints. It has been administered in powder, but used in that form it has irritated the alimentary canal. Given in infusion, a large proportion of its virtues, which consist in a volatile oil, escape. The most common form is the tincture. This preparation has been found of most uncertain value, partly from the depreciation of the root while drying—from the injury it receives in exportation, but more from the fact that the alcohol extracts other qualities, which not only render the extract less efficient, but also produces nausea, and gastric derangement. To obviate all these objections, the Messrs. Brinley have made a fluid extract from the green root, before any part of its virtues have been evaporated, and have thus been enabled to present to the profession a most valuable medicine, possessing all the virtues of all heretofore-made preparations, in an increased degree, without the qualities which detract from the value of the powder and the tincture. Having used the preparation quite extensively for

hysteria, nervousness resulting from masturbation, delirium tremens, &c., (were it necessary I could give numerous cases,) I am prepared to express my firm belief in its superiority to any form of valerian which has been before presented to the community. In this opinion I am supported by the profession generally in New England, where this preparation is in daily use, and by some of the most eminent physicians of this city.

The following is from A. A. Hayes, the State Assayer, which gives the analysis of its ingredients. Some recommendations follow, from various distinguished professors in New England.

"*Oil of Valerian, as furnished by Elder Parker, May 6th*, 1849. *Lowell.*—This oil, of a light yellow color, contains valerianic acid, and a neutral body, besides the volatile oil of valerian. After exposure to air and moisture, an interchange of the elements takes place, a crystalline body appears, while the quantity of valerianic acid is increased.

"The crystalline body appears, by the analysis of Adolph Schliesser, Esq., to be new. In its general character it resembles camphor, but differs from Borneol and Valerol, in chemical properties. Purified by solution in alcohol, and precipitated by water, it presents delicate prismatic crystals of a snowy whiteness. While cold they are nearly odorless, with a slight aromatic, very bitter taste. This substance is volatile, and when heated has the odor of valerian oil. It melts into a perfect fluid, which becomes a crystallized mass on cooling.

"The specific gravity of well-formed prismatic crystals is at 60 F. 1033 to 1055, while the solid crystalline masses are suspended in a fluid of sp. gr. of 1076. Slowly heated, fusion takes place at 198 4-10° F., to 197 7-10° F.; the transparent fluid remains, when cooled, to 195° F., but as it passes to the solid form, the thermometer marks 196 to 197 F. Below 180° the vapor rises rapidly, and condenses in frost-like, delicate, needly prisms of extreme purity. It is probable that the neutral body referred to above, is con-

nected with the production of this new camphor, but as yet experiments are wanting. Mr. Schliesser prefers to get more complete determinations, before he gives the results of the ultimate analysis he has made.

"The oil as obtained, contains all the medicinal constituents of the root, and in practice has been found to be identical with some fine samples of French manufacture. Indeed, the use of the natural fresh root for its production, insures a very perfect product, while the process is the result of the labors of all the eminent chemists who have studied the products of valerian to the present time."

Prof. Phelps, of Dartmouth College, speaking very highly of its efficacy, says:—"In your method of preparation, the active principle is detached from the nauseating constituents of the root, and obtained in solution. We may look upon the Fluid Extract, as a solution of valerianic acid." Prof. Cleaveland, of Brunswick College, says:—"It contains the active, medicinal principle of valerian in a *purer*, more simple and concentrated statet han any other preparation of the root with which I am acquainted. Dr. Stedman, of the City Institution, Boston, says:—"In many cases where opium is inadmissible as a narcotic, anodyne, or antispasmodic, this Extract of Valerian seems to answer the indication quite perfectly." Professors Mott and Parker, of this city, have also expressed their good opinion of this preparation. It is confessedly a simple extract, made by boiling the fresh root in pure water, with the addition of a little alcohol as a preservant. From the trial which I have given it, I am convinced that it will be found to supersede the use of assafœtida, musk, camphor, castor, &c., in a great degree. In a majority of cases I have found that from twenty drops to a teaspoonful, is an ordinary dose, repeated as often as every half hour, if necessary. In delirium tremens much more can be advantageously administered.—*Boston Med. and Surg. Journ., from New York Journal of Medicine.*

[We are pleased to hear of this successful attempt at introducing the culture of valerian with a design to commerce. We have raised it in small quantities for several years past, and had arrived at the conclusion that our market could be as well supplied at home as from abroad. In reference to the soil and climate of New England proving favorable, it is what might be expected from the facts noticed by writers on its culture in Europe. We do not agree with the authors in believing *fresh* valerian to be more medicinal than the older, provided the latter is well cured at first, because the action of the air increases the amount of valerianic acid by the oxidation of the neutral volatile oil, which of itself has hardly any medicinal power. For the same reason, oil of valerian distilled from fresh root, cannot contain so large a portion of valerianic acid, as that from older root, well kept. To convince ourselves of this, we have just bruised some fresh valerian roots and compared them carefully with the best dried English valerian, bruised into a pulp with water. They are much less odorous, less acid to litmus paper, and have much less of the pungent peculiar taste of valerian. We have reason to think that the Bornein, Borneol and Valerol, are of themselves of little value medicinally, but the latter as the source of the acid by oxidation, is the means of the drug growing stronger and more valuable by age, if well cured at first, and subsequently well kept. We have no hesitation in believing that the New England drug will prove equal to the English. It is stated that the valerian grown in high situations, is more medicinal than that grown in low ground. It may be of some importance to attend to this suggestion in its culture in the United States.—EDITOR.]

ART. LXX.—CITRATE OF IRON AND MAGNESIA.

By M. Van der Corput; with additional remarks by the Editor.

The citrate of iron and magnesia appears likely to come into general use among ferruginous preparations, being easy of administration, and not liable to produce constipation. It is prepared by dissolving two parts, by weight, of recently precipitated hydrated oxide of iron in a solution of three parts of citric acid: the liquor is then saturated with carbonate of magnesia, and evaporated to dryness. The salt is in the form of shining brown scales; the taste is sweetish very slightly inky, and not at all disagreeable. It is perfectly soluble in water; it is not deliquescent, so that it may be prescribed in the form of a powder. It may be prescribed in doses of 15, 30, or 60 centigrammes (1½, 5, or 10 grains).

Syrup of Citrate of Iron and Magnesia is prepared by dissolving 8 grammes in 15 grammes of orange-flower water, with 180 grammes of simple syrup. This is one of the most agreeable preparations of iron.

Saccharine Confection of Citrate of Iron Magnesia.

Take of Citrate of iron and magnesia	1 drachm
Powdered sugar	7½ drachms
Powder of canella	1 drachm

Mix, and divide into powders, each containing 12 grains.

Lozenges of Citrate of Iron and Magnesia.

Take of Citrate of iron and magnesia	½ drachm
Powdered sugar	7½ drachms
Saccharine confection of vanilla	½ drachm
Mucilage of tragacanth, a sufficient quantity.	

Mix and divide into lozenges of twelve grains.—*London Journal of Medicine*, April, 1850, from *Journal des Connaissances Medico-Chirurgicales*, March, 1850 and *Hays' Journal.*

[The following formula will be found more practical and will yield a product nearer the equivalent proportions than the succinct one of M. Van der Corput.

Take of Sub Carbonate of Iron (U. S. P.) three ounces.
Common Muriatic acid, half a pint, or a sufficient quantity
Citric acid, eight ounces.
Carbonate of magnesia two ounces and a half.
Solution of ammonia.
Water of each, a sufficient quantity.

Dissolve the sub-carbonate of iron in the muriatic acid, in a porcelain dish, with the assistance of heat and agitation, then filter the solution, if necessary, dilute it with four pints of water, and add the solution of ammonia until it is in slight excess—stirring meanwhile. The precipitated sesquioxide of iron is then washed thoroughly with water, first by subsidence and then on a muslin filter, and the water pressed out of it as much as possible.

Put the citric acid in a porcelain capsule, pour on it a pint of water, add the hydrated sesquioxide of iron till it is all dissolved, and then the carbonate of magnesia. When the latter is dissolved, filter the solution, evaporate it by a water bath, to a syrupy consistence, and spread it on sheets of glass with a flat varnish brush, to dry spontaneously.

The above quantity of hydrated oxide may be obtained from eight and a half ounces (troy) of sulphate of iron, by the process of the United States Pharmacopœia, but the above method, though rather more expensive, is easier for the inexperienced operator.

Citrate of iron and magnesia thus prepared is in greenish yellow scales, transparent, somewhat deliquescent, very soluble in water, insoluble in alcohol and ether, with a slightly ferruginous somewhat acid taste. It may be given in aqueous or syrupy solution, or pills.—Editor.]

ART. LXXI.—REMARKS ON THE PREPARATION OF HYDRARGYRUM CUM CRETA.

By Edward Jenner Coxe, M. D., New Orleans.

The value of an uniformly perfect preparation of this medicine in many affections of the bowels, more particularly of infants, is too well known to require an apology for requesting the insertion of these remarks in the Journal of Pharmacy of Philadelphia. I am induced to make more generally known the following mode of preparing Hydrargyrum cum Creta, in consequence of the remarks of Mr. Procter in the April number of the Journal of Pharmacy, 1850, upon certain changes produced in the article, as well as in the remedial effects uniformly anticipated from its administration.

It appears that the preparation examined and commented upon was made after the formula of Dr. D. Stewart, of Baltimore, in which a certain proportion of resin was used for the purpose of facilitating and expediting the change effected by trituration, which by many is thought to consist in minuteness of comminution. The usual mode of preparing this medicine laid down in the American Pharmacopœia, and the Dispensatory of Drs. Wood and Bache, which should be the authority for all American druggists, is to triturate the proper quantities of mercury and prepared chalk in a mortar, until all the globules shall have disappeared. By some, for the purpose of facilitating the operation, it is recommended to add occasionally a small quantity of water, and by Dr. Stewart, a small quantity of resin. This having been satisfactorily proved by Mr. Procter to be improper, and the first, except at the commencement of trituration, according to my experience, retarding instead of hastening the process, I now proceed to notice that mode of preparation which must necessarily result in a perfectly uniform medicine, not to be affected by any unlooked-for chemical changes.

While engaged in the old and tedious process of tritura-

tion, without, after eight or ten days' labour, having succeeded in completely extinguishing the mercury, Mr. W. Hewson, formerly a druggist of Augusta, Georgia, happened to enter my store, and seeing our occupation, remarked that he had accidentally discovered a simple, quick, and certain mode of accomplishing the object, by putting the ingredients into a well-corked bottle, which was to be kept in constant agitation by the hand until the preparation was completed. By this mode he had found that much less time was expended than by the old one.

Obliged for the information, I lost no time in testing the plan, by putting three ounces of mercury and five ounces of prepared chalk (precipitated) in a quart bottle well corked. I decided, however, to continue the occasional trituration of that in the mortar, upon which so much time and labour had already been expended, for the purpose of instituting a comparison with that about to be made. The result was most satisfactory, as you will be enabled to judge from the sample sent. It follows, conclusively, that if with the amount of succussion expended upon this preparation, it has been made so fine as to prevent the detection of a minute globule by the aid of a glass of moderate power, a further continuance of the same would effect a still more complete comminution. It will be seen that the sample sent presents the fine grey colour attributed to it; and it may be well to state that this preparation is known by many as the Grey Powder, by which appellation I have had it called for.

I feel the more disposed to consider it important to disseminate through the Journal of Pharmacy the above simple plan of preparing a valuable medicine, from the fact that a large proportion of that imported does not possess the characteristic colour, satisfying me that such had been made by the addition of some simplifying agent; with the result of an inferior, if not an injurious, article. The process above detailed will enable all to dispense a perfect preparation, and prevent disappointment at the bedside.

Accompanying the Hydrargyrum cum Creta, I send a sample of Hydrargyrum cum Magnesia, made in the same manner, the proportions being those laid down in the Dispensatory of Drs. Wood and Bache.

It is my intention to prepare another portion of Hydragyrum cum Creta, with a view of ascertaining whether the introduction of a few dozen small pieces of gravel would not materially hasten the preparation, by causing a more speedy breaking up of the globules; and as no deterioration could possibly result, I am disposed to regard the suggestion as an improvement.

By triturating in separate mortars a portion of each sample of Hydrargyrum cum Creta sent, with a small quantity of distilled water, I find that while in both the globules of mercury reappear, they are not so numerous or large in that made by succussion as in the other. From this, it appears to me, two facts necessarily result:

1st. That no possible advantage can accrue from the addition of any substance, other than the gain of a little time, which should never of itself be allowed to enter into consideration in the preparation of any medicine.

2d. That the perfection of the preparation depends in a great measure, if not altogether, upon the minuteness of comminution, which can be carried to an almost indefinite extent by bestowing a corresponding amount of time and labour in the succussion.

[Accompanying the above paper, we received two samples of Hydrargyrum cum Creta: one "received from one of the best importing drug houses in New York." Its colour has a reddish tinge, precisely like that described at page 113 of this Journal, and like it contains a considerable amount of red oxide of mercury. The other specimen was made by Dr. Coxe, and presented all the characteristics of a good preparation.—EDITOR.]

ART. LXXII.—THE KOSSO, OR BRAYERA ANTHELMINTICA.

By Jonathan Pereira, M. D., F. R. S.

[The following notice of Kosso is condensed from an elaborate paper, contained in the London Pharmaceutical Journal, for July, page 15.—*Editor.*]

History.—*Kosso* has been used in Abyssinia as an anthelmintic for more than two centuries. Bruce, in his '*Travels, &c.*' published in London, 1790, mentions this medicine, which he called *cusso*, and proposed to call the tree *Banksia Abyssinica*, after Sir Joseph Banks, but that name having been appropriated, it was subsequently named *Brayera* anthelmintica, by Kunth, after Dr. Brayer, a French physician who resided a considerable time at Constantinople, and who had witnessed the valuable anthelmintic properties of *kosso*, and had himself successfully employed this remedy. After his return to Paris, in 1823, Dr. B. sent some fragments of the male flowers to the Prussian botanist Kunth, who ascertained that the plant which yielded them formed a new genus, near to, but distinct from that of Agrimonia.

Brayera anthelmintica, the only species of the genus yet decribed, is a tree twenty feet in height, branches round, rusty, tomentose-villose, marked by the annular cicatrices of the fallen leaves. Leaves crowded, alternate, interruptedly, impari-pinnate, and sheathing at the base. Leaflets oblong, or elliptically lanceolate, acute, serrate, villose at the margin and on the nerves of the under surface. Stipules adnate to the petiole, which is dilated at the base and amplexicaul. Flowers diœcious, small, greenish, and becoming purple: repeatedly dichotomous; the pedicil with an ovate bract at the base. The so-called male flowers may be regarded as hermaphrodite, inasmuch as the carpels are well developed. The female flowers are somewhat different in their structure. The outer segments of the calyx are much more developed than in the female flowers, and are four or five times

larger than those of the inner row, and are placed somewhat below them; the petals are entirely wanting; the stamina are rudimentary and sterile.

The ripe fruits are unknown. The tree grows in Tigre, Agame, and Shoa, and is cultivated everywhere. Dr. Beke writes that the tree is "found throughout the entire table-land of north eastern Abyssinia, but appears to require an elevation of upwards of six thousand (perhaps seven thousand) feet for its growth. Where I found it most luxuriant, was in the vicinity of the source of the river Abai, (Bruce's Nile) at an elevation of close upon nine thousand feet. Tigre, the northern portion of Abyssinia, being, upon the whole, of lower elevation than the rest of that country, the tree is only found there in a few places."

Bruce gave a very good popular account of *kosso*, accompanied by what he justly terms a "true and exact" figure of the plant. I have compared his plant with a specimen of the plant collected in Abyssinia by Schimper, and contained in the herbarium of my friend Mr. N. B. Ward, and with the commercial flowers, and find that they are fair representations of the plant.

Bruce states that the Abyssinians evacuate once a month "a large quantity of worms; these are not the tape worm. or those that trouble children, but they are a sort of worm called ascarides." Other travellers tell us that the worms with which the Abyssinians are troubled, and for which they employ the *kosso*, is the tape worm. The accuracy of this latter statement has been tested by Dr. Hodgkin, who administered oil of turpentine to an Abyssinian in the service of Dr. Beke, and thereby expelled a Tenia solium, the same kind of tape worm found in England and at the Cape of Good Hope.

Mr. Johnston states that the kosso is gathered for medicinal purposes before the seeds are quite ripe, whilst still a number of florets yet remain unchanged. The bunches are suspended in the sun to dry, and if not required for immediate use, are deposited in a jar.

I have seen only one package of *kosso;* this was kindly opened in my presence by M. Simond of the firm of Caylits, Simond, & Co., the agents of M. Rochet d'Hericourt. It was a deal box, containing about 30 lbs. of the dried flowers, wrapped up in a large skin of red leather. On removing the lid of the box, and untying the leather package, the fragrant or balsamic odour of the dried flowers was very powerful. It appeared to me to be somewhat similar to the combined odours of tea, hops, and senna leaves. The flowers had apparently undergone no preparation beyond that of dessication. The bunches of flowers were perfect and unbroken, though of course compressed. The general colour of the dried mass was greenish yellow; but when the flowers were more closely examined, the edges of the petals were seen to have a reddish or purplish colour.

The taste of the dried flowers is at first not very marked, but after a few minutes, a feeble, senna-like, acrid, unpleasant taste becomes perceptible. By soaking the dried flowers in water, they may be unfolded sufficiently to determine their botanical character. When submitted to microscopic examination, the hairs are perceived to be simple lymphatic hairs tapering at their distal extremity.

In Abyssinia two sorts of kosso are distinguished, viz.: 1st, the *red* kosso produced by the female flowers; 2d, the male flowers known as *kosso esals.* In commerce the two are always mixed.

Adulteration.—Considering the enormous price (about $8.50 per ounce) at which kosso has been hitherto sold in Paris, and the very limited quantity originally supplied by M. Rochet d'Hericourt, it cannot be surprising that the article should be extensively adulterated. Indeed I have been assured on creditable authority, that the powder now selling as "kousso" is, in fact, the powder of pomgranate bark; and that legal proceedings are about being commenced in Paris, to put a stop to the fraud, which is well calculated to injure the reputation of the genuine Abyssinian remedy.

The surest way is to employ only the flowers, and powder them when so wanted.

Kosso has been examined by Wittstein and by Martin:—

Wittstein's Analysis.		Martin's Analysis.
Fatty oil, Chlorophyle,	1.44	Starch, Saccharine matter,
Wax,	2.02	Vegetable extractive,
Bitter, acrid resin,	6.25	Green odorous resin,
Tasteless resin,	0.77	Crystalline substance,
Sugar,	1.08	called *kwoscine.*
Gum,	7.22	
Tannin, striking a green color with iron,	8.94	
Tannin, striking a blue color with iron,	15.46	
Vegetable fibre,	40.97	
Ashes,	15.71	

The ashes consist of potash, magnesia, lime, oxide of iron, sulphuric and phosphoric acids, chlorine and silica.

With regard to the two kinds of tannin, Wiltstein observes, that as far as he knows, this is the first instance recorded of a plant containing simultaneously two kinds of tannin, striking the one a blue and the other a green, colour with the salts of iron.

Although it is not improbable that the anthelmintic property of *kosso* may in part depend on tannin (since the pomgranate bark which contains this principle in abundance, is, like *kosso*, also an anthelmintic,) yet what may be termed the peculiar property of kosso, probably resides chiefly in the bitter acrid resin. This is soluble in alcohol and in ether, and appears to be a neutral body, manifesting neither distinct alkaline nor acid properties.

The crystalline principle of Martin is white in silky crystals, has a styptic taste and is soluble in ether and alcohol. It reddens litmus and dissolves without decomposition in sulphuric, muriatic and nitric acids.

The dried plant evolves a fragrant odour when boiled in

water, which is done with that of the drug, probably to volatile oil of which, however, Wittstein makes no mention.

It is possible that the anthelmintic properties may depend in part on this oil, as Schimper states that in Abyssinia the fluid is considered to have lost its anthelmintic powers in the third year after its collection. In Europe, however, it retains its powers for a longer period (on account of the cooler climate?); for the flowers which have been used for all the recent experiments have been collected more than four years, and we are told in the shop bill of a Parisian pharmaceutist, that they will keep for an indefinite period.

Medicinal properties. Neither the botanical characters, or sensible properties, or chemical composition of Kosso leads to the suspicion that it possesses its valuable anthelmintic properties.

Our confidence in the virtues of Kosso therefore, rest entirely on experience, and the evidence on this point is very strong. All modern travellers in Abyssinia are agreed on the great success of the remedy on the natives of that country; and the experience of physicians in France England, Germany, and Switzerland, confirms the favourable reports made by those who have seen the Kosso used in its native country.

The physiological effects of Kosso, are in general, not very great. Sometimes it excites a slight sensation of heat, nausea, or even vomiting, creates thirst, and frequently, perhaps usually, a gentle action on the bowels. But the latter is commonly so slight, that in a considerable number of cases, it is necessary to follow its administration by a mild purgative. It is obvious therefore, that the efficacy of kosso as an anthelmintic, does not depend on its purgative or evacuant influence, but on its poisonous or toxic action on the worm; in fact it is a true *vermicide.* In one case, that of a woman in France, it brought away ten worms, of which only one manifested evidences of vitality, and that only for a few minutes.

Kosso appears to be an effective anthelmintic in both kinds of tape worm, viz: *Tænia solium* and *Bothriocephalus latus.*

The dealers in kosso assert, that one dose will effectually cure a radical case of tape worm, which is obviously an error, because, admitting it destroys all the worms in the alimentary canal, they may reoccur, provided the patient retains his predisposition. It certainly does not radically cure the Abyssinians, since, as several writers tell us, they resort to this remedy monthly. Schimper, the governor of Adoa, says it does not completely expel the tænia, or at least rarely does. But he adds, that in Europeans, who are less disposed to worms, it may act in a more complete manner. In the Abyssinians this verminous disposition is innate, and is dependent on the regimen they adopt.

Hitherto the great drawback to the use of kosso has been its enormous cost. M. Rochet d'Hericourt is the sole holder, and is said to have 1400 pounds, valued by him at a guinea per ounce, equal to 112,000 dollars !!! As it can be procured in Egypt from caravans coming down the valley of the Nile, its price, which in Abyssinia is moderate, should be greatly reduced.

Administration. Both Bruce and Schimper state that the Abyssinians take a handful of the dried flowers as a dose. In Paris the dose has varied from four to six drachms. In general, however, half an ounce (troy) is considered a dose for an adult. The dose for children is as follows:—From 7 to 12 years 160 grains,—from 3 to 7 years, 120 grains; not exceeding three years, 80 grains.

The kosso should be taken in the morning fasting. The only preparation necessary is, that the last meal of the previous evening should be slight. The evacuation of the bowels by a mild purgative or a clyster, is desirable.

The mode of administering the remedy is as follows: The powdered flowers are to be mixed with lukewarm water, (for an adult, about ten ounces,) and allowed to infuse for about a quarter of an hour. A little lemon juice is then to

be swallowed, and the infusion being stirred up, the whole is taken, liquid and powder, at two or three draughts, at short intervals, being washed down by cold water and lemon juice. To promote the operation, tea (with sugar or milk) may be taken. In three or four hours if the remedy has not operated, a dose of castor oil or a saline purgative should be administered.

ART. LXXIII.—ON THE INFLUENCE OF ROSIN IN PREVENTING THE OXIDATION OF FATTY SUBSTANCES.

By Prof. Olmstead.

Economic Science.—The report in the New York *Herald* of the proceedings of the American Scientific Convention, now in session at New Haven, embraces some remarks by Prof. Olmstead, on the subject of mixing lard and rosin together, which, notwithstanding its homely sound, will be found of no little novelty and practical interest. Prof. O. accidentally observed that rosin added to lard, gives it a degree of *fluidity* not before possessed by the lard, and also prevented the latter forming those acids which corrode metals, copper and brass for example. We extract the following account of some of the properties and applications of the mixture:

The best proportions are by weight—lard three parts, rosin one part. If the rosin be added in fine powder, and the mixture well stirred, (without the application of heat,) it softens and so nearly approaches a fluid, as to run freely when taken up on the stirring-rod, at a temperature of 72 degrees. On melting the mixture, and setting it aside to cool, the following changes take place:—at 90 degrees it remains transparent and limpid; at 87 degrees, a pellicle begins to form on the surface, and soon after it begins to grow slightly viscid, and as the temperature descends, it

passes through different degrees of viscidity, like oils of different qualities, until at 76 degrees it becomes a dense semi-fluid. It is an unexpected result, that the addition of one part in four of rosin, whose melting point is near 300 degrees to lard, whose melting point is at 97 degrees, should render it more fluid, reducing its melting point to 90 degrees, imparting to it the properties of a semi-fluid, at a temperature as low as 76 degrees, and even rendering the preparation of a softer consistency than lard itself, at a temperature as low as 60 degrees. This compound of lard and rosin has, therefore, two somewhat remarkable properties:—

1. It prevents in the lard, and probably in all the animal oils and fats, their tendency to generate an acid, and thus to undergo spontaneous decomposition. A much smaller proportion of rosin than one-fourth, gives to lard this property, destroying, as it does, the tendency of these substances to oxidation. Several important practical applications result from this property. Its use for lubricating surfaces of brass or copper has already been adverted to. It is equally applicable to surfaces of sheet iron. I have found a very thin coating, applied with a brush, sufficient to preserve Russia iron stoves and grates from rusting during summer, even in damp situations. I usually add to it a portion of black lead, and this preparation, when applied with a brush, in the thinnest possible film, will be found a complete protection to sheet iron stoves and pipes. The same property renders the compound of lard and rosin a valuable ingredient in the composition of shaving soap. The quality of shaving soap is greatly improved by a larger proportion of oil than is usually employed, so as completely to saturate the alkali; but such soap easily becomes rancid when wet with water, and suffered to remain damp, as it commonly is when in use. If a certain proportion of this compound is added to common Windsor soap, (say one-half its weight) the tendency to grow rancid is prevented. A very soft and agreeable shaving compound, or "cream," may be made by steaming in a close

cup a cake of any common shaving soap, so as to reduce it to a soft consistence, and then mixing intimately with it half its weight of our resinous preparation, adding a few drops of some odoriferous substance. The same compound forms an excellent water proof paste for leather. Boots, when treated with it, will soon afterwards take the usual polish when blacked, and the soles may be saturated with it, without danger of soiling the floor, as it does not rub off, while the leather is rendered, in a high degree, impervious to water. The perfect solution into which rosin passes when heated with oil, suggested the possibility of improving in this way, the quality of oils used for illumination, and by its reducing the melting point of lard, to render that more suitable for burning in solar lamps. I therefore, added powdered rosin to lard oil, in the proportion of eight ounces of rosin to one gallon of oil, and applied a moderate heat, sufficient to produce perfect solution. I then filled two solar lamps, equal in all respects—the one with lard oil, the other with the same, holding the rosin in solution, and regulating the flames so as to be as nearly of the same size as possible. I measured by the method of shadows, the comparative intensities of light, which I found to be as 7 to 5 in favor of the prepared oil. This burned with a flame of peculiar richness, plainly exceeding in density that from the simple oil; but after two hours the flame of the prepared oil began to decline slowly, and soon became inferior to the other, an effect which doubtless arose from the clogging of the wick. I had hoped, on account of the perfect solution which the rosin seemed to undergo, that the compound would burn freely without encountering this impediment; but in this respect I was disappointed, and can only say that if some means can be devised for avoiding the tendency to clog the wick, the addition of a small portion of rosin to lamp oil or lard, will add essentially to its value for burning in solar lamps, by rendering it less liable to congeal, and by increasing its illuminating power.

[The property of *rosin* to prevent the oxidation of fatty matter, has long been observed by apothecaries in reference to resin cerate; but so far as we know, the fact has never been applied in the manner recommended by Prof. Olmstead. It has frequently been observed, in refitting ship medicine chests after long voyages, that the resin cerate remained free from rancidity, whilst all the other ointments were greatly deteriorated. The action of Benzoin and poplar buds in preventing lard and ointments in general from becoming rancid, as recommended by Deschamps, (American Jour. Pharm., Vol. xv. page 260,) is probably referable to a similar cause.—EDITOR.]

ART. LXXIV.—NOTES ON THE PURIFICATION AND PROPERTIES OF CHLOROFORM.*

BY WILLIAM GREGORY, M. D.,

Professor of Chemistry in the University of Edinburgh.†

1. Chloroform has been prepared both from alcohol and wood-spirit. The latter has been used for the sake of cheapness; but as it is a mixture of several liquids, all of which do not yield chloroform, it gives an impure product, in a proportion which varies much, but is always below that obtained from alcohol. There is therefore not only no advantage, but the contrary, in using wood-spirit, which is not after all, much cheaper than alcohol.

2. But the chloroform from these two liquids, *when fully*

* Although I am alone responsible for the opinions contained in this paper, it is my duty to state, that all the experiments and observations mentioned in it have been made by me in concert with my able assistant, Mr. Alexander Kemp, of whose ingenuity and accuracy I have had constant opportunities of judging.

† Read before the Royal Society of Edinburgh, March, 1850.

purified, is quite identical in all its properties. Its smell, density, boiling-point, and action in the system, are in both cases exactly the same. That from alcohol is no doubt more easily purified than the other, but it also contains certain volatile oily impurities, which must be removed before it can be safely used. The peculiar oils which adhere to both kinds of chloroform are not identical, or at least, not all identical, but they are of analogous constitution and properties.

3. Soubeiran and Mialhe have examined these oils. They contain chlorine, have a disagreeable smell, and when inspired or smelt cause distressing headache and sickness. In the case of wood-spirit, some of its own impurities distil over unchanged, and are also found in the chloroform.

4. It is well known that many persons, after the use of chloroform, have suffered from headache, nausea, and even vomiting, as I have more than once seen. Headache and nausea I have myself often experienced, when I have tried different specimens of chloroform, without taking so much as to produce the full effect.

5. Perfectly pure chloroform does not, so far as I have seen or experienced, produce these disagreeable effects. It is therefore highly probable that when they occur, as they do with some individuals, from the use of chloroform of more than the average goodness of quality, they depend on the presence of a trace of these poisonous oils.

6. All good manufacturers of chloroform purify it by the action of oil of vitriol, which destroys the oils, while at the same time a part of the acid is reduced to sulphurous acid. The chloroform, to remove this, is then distilled with lime or carbonate of baryta, and is tolerably pure if the process be well conducted.

7. But it is not quite pure, and contains a trace, more or less distinct, of the oils. I have found this to be the case with all the best chloroform made here up to 1849; and I have several times seen headache and sickness from the use

of such chloroform, which was the best anywhere made. I must add, however, that the quantity of oils in the chloroform of the best Edinburgh manufacturers although variable within certain limits, was always so small, that that product was fit for use, and only caused headache, &c., in a few peculiarly sensitive persons.

8. It was desirable to have a test for these impurities, as well as an easy and effectual mode of removing the last traces of them, especially as many sorts of chloroform not made here were far inferior in quality to that prepared in Edinburgh. One very delicate test is, that of oil of vitriol, which should be quite colourless, pure, and of the full density of 1.840 at least, as it may be obtained by Mr. Kemp's process, lately read to the Royal Society; when agitated with the chloroform, it becomes yellow or brown, from its action on the oils, which it chars and destroys. Any change of colour is easily seen by contrast with the colourless chloroform which floats above. Pure chloroform gives no colour to the acid. It is essential that the oil of vitriol be colourless and also of full density; for if coloured, it is not easy to see a slight change on its colour; and if below the proper density, that is too weak, it is not much coloured by a chloroform which will render dark brown the acid of proper strength.

9. Another test, still more delicate, I find to be the smell of the oils. When chloroform is poured on the hand or on a handkerchief, it rapidly evaporates; but the oils being less volatile, are left behind; and their smell, previously covered by that of the chloroform, is easily recognised. Until very lately no chloroform was sold, or indeed known, which would stand this test, or even the former.

10. Up to 1849 the best commercial chloroform had a specific gravity of 1.480, which was considered a guarantee of its purity; but it had been obtained by chemists of specific gravity 1.494, and even 1.497. I have found that chloroform of 1.480, when once more acted on by oil of vitriol,

which destroys the oils and becomes brown, may be obtained after removing the sulphurous acid, of specific gravity 1.500 at 60°. This I take to be the specific gravity of pure chloroform. Our best makers have lately, much to their credit, pushed the purification so far as to furnish chloroform even of this highest density, and also in other respects such as it ought to be.

11. There are still, however, many makers in other places whose chloroform is not so pure; and I shall now describe the method which, with Mr. Kemp, I have employed for purifying, perfectly and easily, any commercial chloroform, except one remarkable specimen—a process which will enable any medical man to purify it for himself with the greatest facility.

12. The chloroform, having been tested as above, and found more or less impure, is to be agitated with the oil of vitriol, (half its volume will be sufficient,) and *allowed to remain in contact* with the acid, of course in a clean, dry, and stoppered bottle, and with *occasional agitation* till the acid no longer becomes darker in colour. As long as the action is incomplete, there will be seen, after rest, at the line of contact, a darker ring. When this no longer appears, the chloroform may be drawn off, and for greater security once more acted upon by a quarter of its volume of the acid, which should now remain colourless. It is now to be once more drawn off, and in a dry stoppered bottle mixed with a little powdered peroxide of manganese, with which it is gently agitated, and left in contact until the odour of sulphurous acid is entirely destroyed, and the chloroform has acquired a mild, agreeable, fruity smell. It has then only to be poured off into a proper phial. It will now leave no disagreeable smell when evaporated on the hand. [If the commercial chloroform, after having been *frequently well shaken* and *left for some time in contact* with the acid, has given to it only a moderate tinge of colour, it is probable that it may be completely purified by the first

process. To ascertain this, test a fresh portion in a tube with fresh acid, shaking well and allowing it to stand for some time. If it do not colour the acid at all, then the whole chloroform has only to be finally purified by the oxide of manganese. If the acid become coloured in the test-tube, it will be as well to act on the whole chloroform a second time with fresh acid till it stands the test. Mr. Kemp has observed, in repeating this process for me, the very curious fact that, as soon as the action is complete, and the oily impurities are destroyed, but not sooner, the chloroform tested with the acid in a tube, exhibits a strongly convex surface downwards, where it rests on the pure acid, or what is the same thing, the acid becomes concave at its upper surface. The smallest trace of impurity, not sufficient to affect the density of the chloroform, we have found to render the line of junction horizontal. It is probable that this may become a valuable test of the perfect purity of chloroform; but we shall not say more on this subject until we have thoroughly examined it.] This process requires no apparatus beyond a few stoppered bottles and a *pipette*, if we wish to draw off the whole chloroform without loss, although nearly the whole may be simply poured off. The use of the oxide of manganese is due to Mr. Kemp; and on the large scale the chloroform may be filtered through a cylinder full of it. In this final purification of commercial chloroform, no distillation is necessary. Indeed, no rectification is required at all, if it be well washed with water before using the acid.

13. It may be considered as certain, that the use of chloroform thus purified will very rarely, if ever, cause the disagreeable effects above noticed.* As to more serious bad

* Dr. Simpson informs me, that the purest chloroform he has used not unfrequently causes vomiting. On further inquiries, I find that this occurs when it is administered after a full meal. This can easily be avoided, and must not be confounded with the headache, nausea and vomiting alluded to in sections

results from the use of chloroform, so often spoken of elsewhere, it is enough to state that a large proportion of the cases must be attributed to the use of a liquid so impure as hardly to deserve the name of chloroform at all.

Postscript.—Since writing the above, my attention has been called to a paper by Dr. Wilson, on the specific gravity of chloroform, which he was not able to obtain higher than 1.498. I have therefore to add, that every specimen, whether of specific gravity 1.480, 1.490, or 1.497, which I purified as above, acquired the same density of 1.500, as ascertained by the use of a very delicate and accurate bead, (made by Lovi,) which sank at 60.°5 and rose at 59.°5; and also by three successive weighings with a very delicate balance. It will also be seen, that three commercial specimens had

4 and 5, which symptoms are persistent, and occurred in my experiments always with an empty stomach, the experiments being made an hour or two before dinner. Mr. Carmichael, assistant to Dr. Simpson, has mentioned to me some facts which confirm the view I have taken. At one period, for more than a week, Dr. Simpson and Mr. Carmichael were kept in a state of continual anxiety by the occurrence, in all the puerperal cases in which chloroform was used, of very unpleasant symptoms, particularly of frequent pulse and other febrile symptoms, lasting for some days. At last, after much annoyance from this cause, it occurred to Dr. Simpson that he was using one particular specimen of chloroform above the average in quality. As soon as this idea occurred, he threw away all that remained, and returned to that which he had generally used. The unpleasant symptoms no longer appeared. [I regret much that I had not an opportunity of examining that specimen; but I may add, that the maker, not an Edinburgh one, now produces chloroform of much better quality, though not yet absolutely pure.] But the striking fact is this, that Dr. Simpson and Mr. Carmichael state, that during the period above alluded to, when that one kind of chloroform alone was used by them, their handkerchiefs became quite offensive from the smell left on them, which even adhered to them after washing. There can, I think, be no doubt, that here the oily impurities alluded to in sections 4 and 5 were present in notable quantity.

this density; I could detect no foreign matter in my chloroform; and besides, every foreign matter that is likely to occur *lowers* the density. I have no doubt that Dr. Wilson's specimens would have colored the acid and left a smell on the hand.

I may add, for the maker, that, after distilling the materials which yield chloroform, no distillation or rectification is needed. He has only to wash the heavy fluid with water till its volume no longer diminishes, and then to use the oil of vitriol as above, finishing with the oxide of manganese. Distillation with the acid is of no use, because no proper contact can take place, the chloroform distilling from the surface as it would from mercury. In testing by oil of vitriol, it is best to use some ounces of chloroform, and to shake it in a phial, because in a test-tube, the color produced, if not strong, may be overlooked.

While I acquit the makers of chloroform, who have sold an impure drug, of all desire or intention to adulterate it, I feel it my duty to point out, that the system which permits *any one* to set up as a manufacturer of this or any other potent remedy, without let or hindrance, without any test of his qualifications, without, in short, enforcing a knowledge of chemistry and pharmacy as an essential condition, is a radically bad one; and that our law, in relation to Druggists and Apothecaries, requires reformation. In fact, the evils naturally resulting from it are only neutralized, and that but in part, by the good feeling and principle of the leading manufacturers.

To illustrate this, I may remark, that some of the makers of chloroform must have been very ignorant, even of what was known and published concerning its properties; for, among the specimens I examined, are several of specific gravity below 1.480, which was long ago given as the standard. even so low as 1.347.

That this neglect proceeded more from ignorance than from intention, is, I think, plain from the fact, that a speci-

men labelled "Pure Chloroform" actually contained only a trace, about one-thirtieth, of that substance. I did not ascertain its specific gravity, which must have been far lower than 1.200 or 1.100—nay, possibly, under 1.000, because its impurity was so obvious in every other respect, and the quantity I had was too small; but, on examining it further, I am convinced that its origin was this:—The maker, after distilling the materials, obtained, of course, two liquids, a lighter and a heavier. He evidently *did not know* that the latter was the chloroform, and therefore threw it away, and preserved the *lighter*—a mixture of pyroxilic spirit—of its natural impurities, of the deleterious chlorinated oils and a *trace* of chloroform. At least, such are its characters; and it exactly resembles what would be obtained in the way supposed. But what a fearful degree of ignorance (without any evil intention) is here exhibited! And yet this maker was free to produce and sell *pure chloroform*, which was actually almost *pure from chloroform*, and loaded with deleterious agents.—*Monthly Journal of Medical Science*, May, 1850, *and Pharm. Journ. June* 1850.

[A few weeks since, having occasion for some chloroform, we obtained a pound from a manufacturing establishment in this city. On opening the bottle, the odor of the chloroform was contaminated with that of chlorine, and the stopper had on it a greenish yellow discoloration. On returning it to the chemist with the information of its impurity, we received the following note:

"Dear sir: We have your favor of this morning, in regard to chlorine found in chloroform, and for the same are much obliged, as it gives us some ground, other than our own opinion, for declining to make the article by the late improved process with sulphuric acid. We soon discovered that this change was likely to go on, but some of our customers wanting an article of this kind (*i. e.* made by this process) particularly, we were induced to adopt the improvement."

This chloroform bleached moist litmus paper rapidly, first

reddening it. The acidity is due to hydrochloric acid, generated from the chlorine and moisture adhering to the chloroform operated on by light. Mr. Abraham, in the paper, at page 348, has arrived at similar conclusions.—EDITOR.]

ART. LXXV.—CLIMATE OF AUSTRALIA.

By JOHN GOULD, Esq., F. R. S., F. G. S., &c.

In a country of so vast extent as Australia, spreading over so many degrees of latitude, we might naturally expect to find much diversity in the climate, and such is really the case. Van Diemen's, from its isolated and more southern position, is cooler, and characterized by greater humidity than Australia; its vegetation is therefore abundant and its forests dense and difficult of access. The climate of the continent, on the other hand, between the 25th and 35th degrees of latitude, is much drier, and has a temperature which is probably higher than that of any other part of the world, the thermometer frequently rising to 110, 120 and even 130 deg. in the shade; and this high temperature is not unfrequently increased by the hot winds which sweep over the country from the northward, and which indicate most strongly the parched and sterile nature of the interior. Unlike other hot countries, this great heat and dryness is unaccompanied by night-dews, and the falls of rain being uncertain and irregular, droughts of many months' duration sometimes occur, during which the rivers and lagoons are dried up, the land becomes a parched waste, vegetation is burnt up, and famine spreads destruction on every side. It is easier for the imagination to conceive than the pen to depict, the horrors of so dreadful a visitation. The indigenous animals and birds retire to the mountains, or to more distant regions exempt from its influence. Thousands of sheep and oxen perish, bullocks are seen dead by the roadside, or in the dried-up water holes

to which, in the hope of relief, they had dragged themselves, there to fall and die; trees are cut down for the sake of the twigs as fodder; the flocks are driven to the mountains, in the hope that water may there be found, and every effort is made to avert the impending ruin; but in spite of all that can be done, the loss is extreme. At length a change takes place, rain falls abundantly, and the plains, on which, but lately, not a blade of herbage was to be seen, and over which the stillness of desolation reigned, become free with luxuriant vegetation. *Orchideæ*, and thousands of flowers of the loveliest hues are profusely spread around, as if nature rejoiced in her renovation, and the grain springing up vigorously, gives promise of an abundant harvest. This change from sterility to abundance, in the vegetable world, is accompanied by a correspondent increase of animal life; the waters become stocked with fish, and the marshy districts with frogs and other reptiles, hosts of caterpillars and other insects make their appearance, and, spreading over the surface of the country, commence the work of devastation, which, however, is speedily checked by the birds of various kinds that follow in their train. Attracted by the abundance of food, hawks, of three or four species, in flocks of hundreds, depart from their usual solitary habits, become gregarious and busy at the feast, and thousands of Ibises (*Ibis spinicollis*) and other species of the feathered race, revel in the profusion of a welcome banquet. It must not, however, be imagined that this change is effected without its attendant horrors; the heavy rains often filling the river beds so suddenly that the onward-pouring flood carries with it every thing that may impede its course, and woe to the unhappy settler whose house or grounds may lie within the influence of the overwhelming floods!

So little has as yet been ascertained respecting the climatology of Western, North-Western, and Northern Australia, that it is not known whether they also are subject to these tremendous visitations; but as we have reason to believe

that the intertropical parts of the country are favored with a more constant supply of rain, as well as lower degree temperature, it is probable that they do not occur.

American Journal of Science and Arts, July 1850.

ART. LXXVI.—ON A DIRECT METHOD OF OBTAINING IODINE FROM CERTAIN SPECIES OF SEA-WEED ON THE LARGE SCALE, WITH A MODE OF PROCURING IT AS A SUBSIDIARY PRODUCT ADAPTED TO COAST FARMS.

By George Kemp, M. D.,
Cantab., Fellow of the Cambridge Philosophical Society.

The following paper contains the summary of a research on the above subject, made on the Isle of Man, at intervals, during the year 1847, 1848, and 1849; and, although distinguished by many district features, the principles involved are equally applicable to all localities similarly circumstanced. As a preliminary step, it may not be improper to remind the reader, that on all sea-coasts the marine vegetables may be classified according to the depths at which they are found; and for our present purpose it will merely be necessary to include them under two general classes, the shallow and deep water sea-weeds; the former of these embracing such growths as flourish between high and low water-marks, and the latter such as are only, or principally, found from low water-mark to the depth of three or four fathoms. We instance the *Fucus vesiculosus*, *F. serratus*, *F. nodosus* and *Halydrys siliquosa* as specimens of the first of these divisions; whilst the *Laminaria digitata*, *L. saccharina* and *L. bulbosa* will be sufficiently illustrative of the second, and have indeed furnished the principal materials for the investigation on which we are about to enter. It may further be premised, that nature, equally provident and fertile in her resources, seems to have destined these

marine productions to act as her storehouses for the accumulation of certain inorganic bodies essential to terrestrial vegetation, and which, but for this provident care, would rapidly be out of human reach. In the Isle of Man this economical arrangement is peculiarly necessary. The more soluble portions of the granite, felspar, clay-schist, &c., which by attrition and solution are rapidly conveyed to the sea, are thus again presented to the agriculturist, and that in a condition admirably adapted for assimilation by the organs of plants; without this wise provision, he would be principally dependent for alkaline salts on masses of hard intractable rocks, the mechanical state of which would naturally form an almost insuperable barrier to the process of absorption. Referring to the excellent work of the Rev. J. G. Cumming for information on the geology and localities of the island, we now proceed to the principal chemical features of the two classes of sea-weed to which we have alluded; and it may be stated, as the general result of analysis, that the metallic base preponderating in the Fuci is sodium,* combined with oxysulphion, chlorine, and small quantities of iodine and bromine; whilst the plants which flourish in what Prof. E. Forbes has denominated the laminarian region are characterized by containing a preponderating quantity of potassium, with a far larger proportion of iodine than in the former species, and are on this account therefore of more interest and importance to the manufacturer. Many practical difficulties however prevent the maximum advantage to be derived from the above facts in a manufacturing point of view; and, in order to obviate them as much as possible, the writer was induced, at the commencement of his research, to apply to the Commissioners

*Prof. Thompson states, on the authority of Gaultier de Claubry, that the *Fucus serratus* contains more iodine than *F. digitatus* or *vesiculosus*. The experience of the author is directly the reverse, presuming that the *F. digitatus* is identical with what is now denominated *Laminaria digitata*.

of Woods and Forests for permission to cut the seaweed from the rocks, the preliminary object being to make comparative experiments on the particular period of growth at which these marine productions contain the largest amount of the element in question. Various circumstances, however, partly local, partly arising out of the nature of the case, rendered this formality unnecessary; it was, in fact, soon determined, that, in the earlier periods of growth, iodine is almost absent, progressing however with the advance of the plant, and at the maximum, at the precise period when the weed yields to the autumn tempests and is drifted on the shore, thus saving all the additional expense and risk of collecting from the rocks. Assuming then that two main points are established, viz. that the most fertile source of iodine is in the laminarian species, and in them at the period when their perennial functions are completed, we may allude to the present mode of obtaining the element from the ashes of the plant, which we shall designate the kelp process, and show how the assumed facts influence the operations of the manufacturer, or rather the impossibility of obtainingthe maximum advantage derivable from a proper application of these facts, with the present mode of extracting iodine by the kelp process. All sea-weed contains a very large proportion of sea-water; in the small shallow-water species this can be removed, by exposure in summer to the wind and sun, without great difficulty; in the other species, on the contrary, even under the most favorable circumstances, decomposition will occur before the plant can be brought into a condition favorable for its combustion; the consequence is, that the kelp process is principally confined to a species which contains but a small portion of iodine, and to a period of the year at which the other species has not arrived at maturity. The disadvantage does not rest here. The temperature, in forming kelp, cannot be so nicely controlled as to prevent the more volatile iodides being dissipated, or, what is of still more fre-

quent occurrence, being lost by mechanical agency, a very brisk current of hot air being set in motion by the very nature of the operation, accompanied as it usually is by a slight breeze. But another important point remains to be considered, which is indeed almost prohibitive of obtaining kelp rich in iodine in districts thickly inhabited. The smoke arising from the combustion of the *Laminaria digitata* particularly, is most offensive; and, unless the wind is blowing off shore, the burning the weed on the large scale would be prohibited, or the party who undertakes the process be constantly engaged in law proceedings; and as the laws in the Isle of Man are either peculiar or peculiarly administered, no reasonable prospect could be entertained of ultimate success. All these circumstances, taken collectively, induced the writer to seek out a method by which these evils might be obviated: and in doing so it became necessary to determine in what portion of the plant the element sought after is contained in greatest abundance, and whether it would not be practicable by mechanical means to arrive at the desired result. Excluding then for the future the shallow-water species, we confine our remarks to the modes pursued with reference to the *Laminaria digitata* and *L. saccharina*, principally indeed to the first, as it not only presented the greater difficulty, but also was furnished in greater abundance.

On making then a transverse section of the stem of the *L. digitata*, we observe externally a thin cortical layer, next a mass of condensed cellular tissue, and internally a transparent medullary central portion, generally of an elliptical form. Applying to one of these súrfaces a weak solution either of acetic or hydrochloric acid, we cover it with a very slight layer of starch-paste, and cautiously expose it to the action of chlorine, from the mouth of a bottle containing a solution of that gas. The iodine being set free, and rendering its presence perceptible through combination with amylon, will be immediately proved to be enveloped

in cells between the external cortical and central medullary portions. An important step has now been made in the investigation, and hopes were at first entertained that the object sought after would at once be arrived at, by exposing the stem of the plant to pressure, and from the liquid obtained, which it was presumed would contain the greater portion of iodides in solution, without further trouble liberating the iodine itself. Great physical difficulties however presented themselves; and so condensed was the cellular tissue found, that on exposing a portion, not exceeding the dimensions of a cubic inch, to the pressure of a ton weight, but a very small portion of fluid was obtained, although Professor Forchhammer* estimates this at 75 per cent., a quantity far less than has been found at different times by my friend Mr. Waldie of Liverpool, and myself. It was determined, therefore, in the next experiment, to break up the cellular tissue as completely as possible, by rubbing the stem on an ordinary domestic grater. The result was perfectly satisfactory, and the iodine liberated, by ordinary chemical operations, with the greatest ease; but it was necessary to modify the plan, so as to adapt it for application on a large scale. A turnip-cutter was therefore furnished with a small band-wheel of 6 inches in diameter, and this connected by means of a band with a wheel 5 feet in diameter, which in working was caused to revolve eighty times per minute, thus communicating to the smaller wheel a velocity of 800 revolutions per minute; and the machine being supplied with the stem divested of roots and terminal leaves it was cut into small slices with great rapidity. The original intention was to pass these slices through another

* "At the point of Kronborg, near Elsingor, about 30,000 two-horse loads of sea-weed are annually thrown on shore in the months of November and December, which, calculated at 500 lbs. dry plants each, are equal to 15 millions of pounds."—Forchhammer *on the Metamorphosed Fucoid Schists in Scandinavia; Report of British Association for* 1844, p. 163.

machine, prepared for the purpose, which would have reduced these slices to a pulp, thus effectually breaking up the cellular tissue, and then proceeding to express the fluid and liberate the iodine as in the type experiment. Nature however interposed to save the trouble, for the mass of slices having been left in a heap for about twelve hours, a species of fermentation commenced, with evolution of heat and other phenomena, which reduced the whole mass to a pulp without further trouble; and this mass being submitted to adequate pressure, completed the object in view. The fibrous tissue left in the press still contains iodine; but the pressed mass is so easily charred at a low temperature, that on a large scale this method will no doubt be preferred to the more circuitous course.

With reference to the *Laminaria saccharina*, which in the autumn is very rich in iodine, the plan of extraction is still simpler. Having collected this, as drift-weed, it is only necessary to heap it up in vats, or other receptacles of adequate size, with a tap at the bottom to allow the liquid to escape. For some hours nothing but sea-water runs off; at a certain stage, however, and time, mainly dependent upon quantity and temperature, active fermentation sets in; and as it is presumed that the liquid running off is carefully tested for iodine from time to time, immediately its appearance is indicated the tap should be closed, and during the next twelve hours the contents of the vat should be occasionally moved or stirred about. When the contents have been reduced to a soft pultaceous magma, in which all remaining cellular tissue can be readily broken down by the hand, the addition of quicklime in sufficient quantities, which will vary with the amount of substance operated upon, but may easily be determined by experience, completes the process; and in this case almost the whole of the iodides in solution may be removed by expression. In localities where lime is e xpensive, the process of charring may be resorted to.

The subsequent steps of the operation will be much influenced by circumstances. If the object be merely to save the iodine, a variety of methods may be adopted to effect this purpose, one of which will be mentioned in the sequel; if, on the other hand, it be a consideration to obtain the potash salts, evaporation and probably repeated crystallizations, must be resorted to; and the facility of obtaining fuel at a little expense will of course become an important element for consideration. It will however at once occur, that the cellular tissue which remains after pressure will render important service in this case; at all events, but little experience and ingenuity will be called into requisition for combining all the favorable circumstances in such a manner as to insure a profitable arrangement. Whilst the use of iodine remains a matter of importance only in a pharmaceutical point of view, the demand must necessarily be limited; and such a supply as could easily be obtained by the above method would materially affect the market; but should any means be discovered of rendering it adapted to the purposes of dyeing, the application of sufficient capital would doubtless be attended with very profitable results.

Another case presents itself, in which a modification of the above plan, carried out on a limited scale, may be of extensive practical benefit. On all coasts similarly circumstanced with that to which we more especially allude, numerous creeks occur, which for the most part either belong to farms in their immediate neighborhood, or do so virtually, as access to them can only be obtained by a right of way through such farms; in these, immense quantities of drift-weed accumulate after every storm, which in many cases are entirely wasted, and in many others have to be conveyed to the land by roads almost impassable. Now it will be seen in the sequel, that, by a little attention, the agriculturists may convert these natural disadvantages into sources of profit; on the one hand, eliminating an impor-

tant element, which under ordinary circumstances is entirely lost; on the other, reducing all that is valuable for farm purposes into a concentrated form, admitting of transit with great economy of labor and expense. Taking Professor Forchhammer's estimate, that each ton of sea-weed is reduced by drying to 500 lbs. of solid matter (and, so far as the writer's experience is concerned, this estimate is far above the mark,) in every ton of *wrack* conveyed to the land, the farmer actually carts away, and that sometimes for miles, 1740 lbs. of water, which is all but lost labor, his object being merely to supply his land with the salts of potash and soda. By pursuing the following method, not only may a large saving be effected, but in many small holdings intelligence and industry may, from the sea-weed alone, secure a greater return than the whole produce of the farm taken collectively. It is now the writer's object to project a plan for the accomplishment of this result; but it will be previously necessary to make a slight digression.

The mutual reaction of free iodine and starch is well known ; but little attention has hitherto been bestowed on the circumstance, that the facility with which iodine is precipitated from its solutions by means of starch varies exceedingly. The object of the writer being to fall on some plan, involving little expense and chemical knowledge, to effect the complete precipitation of free iodine from its solutions, he was led to the more minute investigation of the subject in detail; and, in the first place, it was found out, that the facility with which the iodide of amylon was precipitated depends in a great measure on the size of the starch-granule. This would lead one to suppose that the vesicular covering of the granule is the substance which more immediately combines with the iodine, or that the solution of iodine enters the vesicle by means of endosmose ; in either case the practical result will be the same. Now, according to Raspail's observations, the granule of millet

starch is only 1-1000th, that of wheat 1-500th, whilst that of the potato 1-200th of an inch in diameter. By taking advantage of this observation, even considering it as a mere approximation (for the granules of the same species vary exceedingly in size,) the facility of precipitation is much increased, favored as we are by the additional circumstance, that this is the very species of starch which may be obtained at the least, and in fact almost nominal cost. But, further, by adding a solution of ammonia to a solution of the neutral acetate of lead, we obtain, as is well known, the tribasic acetate of lead, $PbO(C^4H^3O^3)+2PbO$. By adding a solution of this compound to starch, we form an insoluble compound of starch with oxide of lead; and by making use of this substance, which can be obtained with great facility and at a trifling expense, we can in a few seconds precipitate any quantity of iodine from a solution; by taking advantage also of the weight and denseness of the precipitate, we can decant the supernatant liquid, and, if necessary, repeatedly wash the precipitate without loss. A few precautions will still better adapt the above plan to the end designed, and facilitate manipulations considerably. Let the potato-starch be formed as usual, by grating and washing, and then strained through a sieve or coarse linen, to separate it from the broken-down cellular tissue; the turbid liquid should now be allowed to repose for a few minutes, and the supernatant milky fluid be poured off; the residuum is again washed, and treated in the same manner, until the precipitate subsides rapidly, and the liquid clears in a few seconds; the smaller granules are thus removed. Having previously prepared a strong solution of acetate of lead, with the addition of caustic ammonia, this is now added, and the the compound sought after immediately prepared, which is then ready for use, or may be strained through flannel, dried, and kept ready for application.

We now revert to the course which we propose for the adoption of the agriculturist.

The sea-weed being collected in heaps, may be suffered to drain itself of the sea-water mechanically retained about it. As this will occupy some hours, the time may be employed by women and children in trimming the stalks of the tangle (*Laminaria digitata*) of leaves and roots, and arranging them ready for the turnip-cutter and other operations, as stated above. The whole of the remainder may then be conveyed into old hogsheads, in a sheltered spot near the beach, and allowed to ferment; the succeeding operations having already been described. A quantity of liquid is now assumed to have been collected, to which is added commercial hydrochloric acid, until a very marked acid reaction is obtained; a solution of ordinary chlorinated lime is then added, to disengage the iodine, taking especial care not to use an excess. A very little practice will decide the quantity necessary, as the brown color of the liquid will increase up to a certain point, and the smallest addition of chlorine, when this has been attained, will diminish its intensity. Having thus liberated the iodine, it is precipitated with the prepared starch diffused through water, continuing its addition until it is no longer rendered blue by the iodine. The remainder of the process consists in decanting the fluid portion, and straining the residuum, which, when dry will be immediately available to the iodine manufacturer, and from which the iodide of potassium may be formed by the addition of sulphuret of potassium, or other appropriate means. The fluid portion being rich in potash, soda, and magnesian salts, will form a most important contribution to the liquid manure-tank, or may be thrown over the compost in the farm-yard, with the additional advantage of fixing the ammonia through its excess of hydrochloric acid. The cakes of cellular tissue should be stored in a dry place, and made use of as fuel for steaming turnips, and other similar operations, taking care to preserve the ashes; these should also be lixiviated, and thus every particle of iodine may be saved.

Such is a general outline of the writer's plan. In a journal nothing more can be given; but those who are interested in the matter will find little difficulty in expanding these views, or adapting them to special purposes.—*Chemical Gazette, July 1st*, 1850.

[Why cannot our ingenious countrymen of the ocean counties of New England, apply the facts stated by Dr. Kemp to the algaceous plants of their own rock bound coast, and thus introduce a new and valuable item of manufacture? The subject is worthy of the attention of some of our pharmaceutical brethren of Maine and Massachussetts, in a scientific, as well as in an industrial point of view. It would look well, in the enumeration of products of American origin in the World's exhibition of 1851 at London, to see Iodine in the list.—EDITOR.]

ART. LXXVII.—ON THE PURIFICATION OF CHLOROFORM.

BY MR. JOHN ABRAHAM.

In *Chambers' Journal* for May 4, is a paper by Professor Gregory, of Edinburgh, on the subject of Chloroform, which has been copied into other publications and extensively read.

He says, "as no absolutely pure chloroform has yet been sold, so far as we can ascertain, by any maker out of Edinburgh, while the large majority of the makers have sold a very inferior article, it is not surprising that its use should have proved less satisfactory, for example, in London than here. To give an idea of the fact, we may state that we have examined recent specimens which contained only three fourths, one half, one fourth, one fifth, and even so low as one twentieth of their volume of chloroform." It is not stated where these specimens were obtained, but

afterwards, he says, "fortunately for Edinburgh and for chloroform—we may add, fortunately for suffering humanity—the Edinburgh makers have always taken the best means and the greatest pains to produce good chloroform." The Professor gives what he calls a test of its purity, and "an easy mode of purification," which consists, in agitating the chloroform with sulphuric acid, and afterwards with peroxide of manganese. "It is then of specific gravity 1.500, and absolutely pure." The blackening of the sulphuric acid is a proof of impurity, and its absence the reverse.

Now, Sir, I beg to caution your readers that the fact of any sample of chloroform having been manufactured in Edinburgh, is no proof of its purity; and I would recommend them to apply another test in addition to the one suggested by the Professor.

It is well known that the Scotch manufacturers having spirit much cheaper than it can be obtained in England, have a great advantage over the English makers of chloroform. In February last, it was offered to me by one of the most respectable of the Edinburgh houses, at a price very much lower than I had ever before paid, and in consequence I obtained two Winchester quarts. It was professedly of the density 1.497. I found it about that, and I considered it good, though I thought it a shade less sweet than what I had been accustomed to use.

Last month I found that it had acquired a suffocating odor, a greenish, oily-looking substance was deposited on the sides of the bottle, and the same appearance is evident in one of the bottles which is nearly full, and which has not been opened whilst in my possession, and has been kept in a dark cool closet. Moistened litmus paper suspended over it in a bottle was first reddened and afterwards bleached. Water with which it was washed indicated hydrochloric acid in considerable quantity. The bleaching I attribute to free chlorine, as I did not find sulphurous acid. It was unfit for respiration. Sulphuric acid was but slightly discolored by it.

I next examined chloroform of Liverpool manufacture, which I had in my possession before I received the sample from Edinburgh; it showed no trace of acid or free chlorine; it discolored sulphuric acid considerably, but had no effect on litmus paper suspended as before. A slight inhalation of it produced no unpleasant effects, and as I have repeatedly inhaled and witnessed the administration of chloroform of the same maker, with the most satisfactory results, I venture to doubt whether the substance which blackens the acid is always that which produces the unpleasant effects sometimes attributed to chloroform.

I next tried the Professor's mode of purification, but after its application the reddening and bleaching of litmus paper was produced by both preparations. From the Liverpool chloriform I had not much difficulty in removing these unsatisfactory indications; but with the Edinburgh I have had great difficulty, and I have only succeeded after repeated agitations with sulphuric acid, carb. barytes, milk of lime, and several distillations. It remains to be seen whether the purification is real—whether it will keep good.

Professor Gregory gives a second test of the purity of chloroform, which he considers still more delicate than the former. He states that pure chloroform leaves no smell when allowed to evaporate from the hand, and that impure chloroform bears an odor which is generally in proportion to its effect in coloring the acid. I infer that the substance which blackens the acid is not always the same, because the facts are, in my judgment, not so in the samples of which I have spoken. I find that dropping the chloroform on paper affords the best means of applying the test, and that specimen which darkens the acid considerably, leaves, if any, the less smell. I shall be happy to send you specimens. My first note of the sp. gr. of chloroform is in Nov. 1847, about the time it was made known as an anasthetic. It is 1.485 and 1.489. My next is 1.491, and the Liverpool chloroform, of which I have spoken, is 1.495, at 60°.

I have to-day received an 8lb. bottle of chloroform from another Edinburgh house, who showed me some time ago a certificate from Dr. Gregory, that their chloroform was absolutely pure. It has been opened and examined by an assistant in my presence. It is very similar to the former Edinburgh specimen. Its odor is similar. It reddens, and speedily bleaches litmus paper, suspended as before. Its sp. gr. at 71° appears 1.490 in a bottle gratuated at 60°. It scarcely colors sulphuric acid. I have not had time to make a more complete examination.—*London Pharmaceutical Journal, July* 1, 1850.

ART. LXXVIII.—THE TABLE LAND OF THIBET.

By Joseph Dalton Hooker.

In April last we had occasion to speak of the first fruits of Dr. Hooker's mission to explore the botanical and physical character of the Himalaya. He had ascended the eastern extremity, within sight of the great snowy range, of which the peak Kinchin-junga, altitude 28,172 feet, is the loftiest yet known in the world,—and was anxiously waiting in the environs of Darjeeling, with the view of reaching the great table-land of Thibet, and determining the questions submitted to him by Humboldt relative to its elevation and snow lines. Owing to the jealousy with which the frontiers are guarded by the Chinese and Sikkim tribes, and the difficulty of obtaining provisions and guides, it was some months before Dr. Hooker could make the pass.—This, however, has been effected:—as the following letter describes.

Tungu, N. E. Sikkim, alt. 13,500 *ft. July* 25, 1849.

I have at length carried my point, and stood upon the table-land of Thibet, beyond the Sikkim frontier, at an ele-

vation of 15,500 ft., at the back of the great range of snowy mountains. The pass is about ten miles north of this. We have Thibetan ponies, mounted thereon *á la Tartare*, but I walked a considerable part of the way, collecting many new plants. The Thibetans come over the frontier in summer to feed their Yaks, and reside in horse-hair tents. I entered one and was mueh amused with a fine Chinese-looking girl, a jolly laughing wench, who presented me with a slice of curd. These people eat curd with herbs, milk, and Fagopyrum bread—only the richer can afford to purchase rice. They have two sorts of churn; one is a goat-skin, in which the cream is enclosed and beaten, stamped upon and rolled; the other is an oblong box, a yard in length, full of rhododendron twigs, frosted with butter—and maggots. Some miles farther we reached the tents of Peppin, the Lachen Soubah, and were most graciously received by his squaw and family. The whole party squatted in a ring within the tent, myself seated at the head on a beautiful Chinese mat. The lady of the Soubah made tea, adding salt and butter, and each produced our Bhotea cup, which was always kept full. Curd, parched rice, and beaten maize were handed liberally round. Our fire was of juniper wood, and the utensils of clay, moulded at Dijarchi, except the bamboo churn, in which the tea, salt, and butter were churned previous to boiling. * * Presently a tremendous peal, like thunder, echoed down the glen. My companions started to their feet, and cried for me to be off, —for the mountains were falling and a violent storm was at hand. We pursued our way for five or six miles in a thick fog; the roar of the falling masses from Kinchin-jow on the one hand and Chomoimo on the other being truly awful. Happily, no fragments can enter the valley, by reason of the low hills which flank the river along whose bed we were journeying. Violent rain ensued, and drenched us to the skin. Gradually, as we ascended, the valley widened; and at the altitude of about 15,000 feet we emerged into

the broad, flat table-land, composed of range after range of inosculating stony terraces, with a little herbage, amongst which the Lachen river meanders. Five hundred feet farther we found ourselves at the top of a long flat ridge, connecting the northwest extreme of Kinchin-jow with Chomoimo,—and here stood the boundary mark. Happily, the weather cleared. Northward the plateau dipped by successive very low ridges, overhung with a canopy of the vapors that had deluged us. Easterly was the blue sky and low ridges of the lofty table-land, which here backs the great range. To the west the spurs of Chomoimo and much mist veiled the horizon. Southeast Kinchin-jow, a flat topped mass of snow, altitude 20,000 feet, rose abruptly from rocky cliffs and piles of débris. Southwest was Chomoimo, equally snow; while southward, between these mountains, the plateau dipped into the funnel-mouth head of the Lachen valley. Here I had an opportunity of solving the great problem—the elevation of the Snow Line. Strange to say, there was not a particle of snow to be seen anywhere *en route*, right or left, nor on the great mountains for 1,500 feet above my position. The snow line in Sikkim lies on the Indian face of the Himalayan range, at below 15,000 feet—on the Thibetan (northern) slope at above 16,000! I felt greatly delighted, and made a hasty sketch of the surrounding scenery:—somewhat rude, for at this great elevation my temples throb, and I retch with sickness.

Just above 15,000 feet all the plants are new; but the moment you reach the table-land nine-tenths of them disappear. Plants that are found at 12—13,000 feet on the Indian approaches to Thibet, did not ascend to the top of the Pass; still, as I always expected, at the turning point where the alpine Himalayan vegetation is to be soon replaced by Thibetan sterility, there is a sudden change in the *Flora*, and a development of species which are not found farther south, at equal altitudes in the Himalaya. We made a fire

of Yak dung dried, and blew it up with bellows of goat skin, armed with a snout of Yak's horn. My poor Lepchas were benumed with cold. I stayed an hour and a half on the Thibetan side of the frontier, and obtained good barometrical observations, and others with boiling water,—but the latter process is infinitely the most troublesome. On our return the weather cleared magnificently, and the views of the great mountains already named, rising perpendicularly, exceeded anything I ever beheld. For 6,000 feet they rise sheer up and loom through the mist overhead; their black wall-like faces patched with ice, and their tabular tops capped with a bed of green snow, probably from 200 to 300 feet thick. Southerly down the glen the mountain sunk to low hills, to rise again in the parallel of the great chain, twenty miles south, to perpetual snow, in rugged peaks. We stopped again at Peppin's tent for refreshment, and I again took horse. My stubborn, intractable, unshod Tartar pony never missed a foot. Sharp rocks, deep stony torrents, slippery paths, or pitch darkness, were all the same to him. These ponies are sorry looking beasts; but the Soubah, who weighs sixteen stone, rode his down the whole thirty miles of rocks, stones, streams and mountains; and except to stop to shake themselves like a dog, with a violence that nearly unhorsed me neither his steed nor mine exhibited any symptoms of fatigue. Fever rages below from Chootam to Darjeeling. My people behave admirably, and I never hear a complaint; but I find it very hard to see a poor fellow come in, his load left behind, staggering with fever, which he has caught by sleeping in the valleys, eyes sunk, temples throbbing, pulse at 120, and utterly disabled from calling up the merry smile with which the kind creatures always greet me. We have little rain, but much mist; and I find great difficulty in keeping my plants in order. Do not be alarmed for me about fever, for I shall not descend below 6,000 feet. I have not been below 10,000 feet for the last two months. I lead a hard but

healthy life; and know not what it is to spend a lonely-feeling hour, though without a soul to converse with.—Arranging and labelling plants, and writing up my journal, are no trifling occupation, and I am incessantly at work.—*Silliman's Journal March*, 1850, *from Athen.* 1146.

LXXIX.—ON A TEST FOR DISTINGUISHING ACETONE FROM PYROXILIC SPIRIT, AND ON THE QUESTION, WHAT IS THE WOOD-NAPHTHA OF DR. HASTINGS?

[Several years ago, soon after the employment of acetone in phthisis was suggested by Dr. Hastings, we published an article from the Pharmaceutical Journal, which indicated acetone or pyroacetic spirit as the agent designed by him. We now publish a notice by Mr. Scanlan, from the same Journal for April, of a test for distinguishing acetone from pyroxilic spirit, together with a discussion bearing upon the subject, in which Dr. Hastings took part, by which it appears that pyroxilic spirit and *not* pyroacetic spirit is the true *wood naptha*. On applying the test to a specimen of commercial wood naptha, we find it indicates *pyroxilic spirit*.—EDITOR.]

It is now some years since Dr. Hastings introduced to the medical world naphtha as a new therapeutic agent in phthisis.

As there are several fluids to be met with under the name of *naphtha*, considerable doubt existed as to which of them should be used as "medical naphtha" by the compounder. The only tests relied upon, I believe, for a long time, were miscibility of the naphtha with water without becoming milky, and its not being blackened by the addition of a drop or two of concentrated sulphuric or of nitric acid. Any

"wood naphtha" met with in commerce, when repeatedly rectified, over quick lime, will be found to stand these tests; and hence, when so rectified, was considered to be the proper naphtha to be used in medicine.

A question subsequently seems to have arisen as to the dependence to be placed upon these tests, and it was asked, Is it pyroacetic or pyroxilic spirit that should be used?—and how are we to distinguish readily between the two? Accordingly we find this subject fully discussed in the *Pharmaceutical Journal* so far back as the year 1843, vol. iii., p. 33.

In this article upon Naphtha, it is stated that pyroacetic spirit, or acetone, "is the kind of naphtha which Dr. Hastings uses;" and a mode of distinguishing this fluid from pyroxilic spirit, or ordinary wood naphtha, is pointed out as suggested by Dr. Ure. It is the way in which nitric acid acts upon these two different substances. This test may be depended upon; but is almost dangerous, as nitric acid of sp. gr. 1.45 acts with explosive violence upon acetone.

Chloride of calcium affords us a much more ready and certain mode of distinguishing acetone from wood-spirit naphtha, the former having no action upon it, while the latter dissolves and combines with it. It will be found that a drop or two of a *saturated* solution of chloride of calcium, added to pyroacetic spirit in a test tube, is immiscible with it, and separates after agitation, whilst such a solution is instantly dissolved by the pyroxilic spirit.

It should be ascertained beforehand, that the "naphtha" under examination does *not* separate into two fluids, or become milky on the addition of water.

Mr. Bell, in resuming the discussion, said that, although it was very important to have a ready means of distinguishing the different liquids which are sold under the common name of *naphtha*—and Mr. Scanlan appeared to have supplied this deficiency—yet there was another

equally desirable object to be attained, and that was to ascertain which kind of naphtha ought to be used in medicine when prescribed for pulmonary affections. He was glad to see that Dr. Hastings, who had originally introduced the use of naphtha as a medicinal agent, was present, and he hoped that he would favor the meeting with the result of his experience on the subject. There were several specimens of naphtha on the table, some of which had been used under Dr. Hastings's observation, and he would suggest that the test should be applied to these, so as to determine whether they were acetone or pyroxilic spirit.

On applying Mr. Scanlan's test, it was found that those specimens which had been most approved of as medicinal agents, were pyroxilic spirit.

Dr. Hastings observed that the subject then before the meeting was one in which he was deeply interested. He had found from long experience, that some of the liquids, sold under the name of naphtha, afforded relief, by allaying irritation, in certain cases of pulmonary affection; but while this was the case with some of the naphthas of commerce, there were other specimens which produced an opposite effect, and promoted instead of allaying irritation. He had never been able to ascertain what the real cause of this difference in effect was, and the uncertainty as to whether a patient got the right kind of naphtha or not, had been to him a constant source of annoyance and difficulty. Some time ago it was suggested to him by several chemists who had directed their attention to the subject, that the true medicinal naphtha—that which, from experience, he found to be beneficial—was acetone, or pyroacetic spirit, and not pyroxilic spirit; and accordingly several manufacturers, and among them the house in which Mr. Scanlan is engaged, had carefully prepared pyroacetic spirit in a state of considerable purity for medicinal use. He could not say that his experience in the use of this, or of any of the specimens which by the use of Mr. Scanlan's test were proved

to be acetone enabled him to give the preference to acetone over pyroxilic spirit, and he still felt that the difficulty hitherto experienced was not yet removed. It appeared also that the proposed test was not a conclusive one, for he had found that it gave the same reaction with coal-tar naphtha as with acetone.

Mr. Redwood explained that the test was only intended to be used as a means of distinguishing between acetone and pyroxilic spirit. He thought it was now sufficiently evident that the kind of naphtha best suited for use in the cases in which it was prescribed by Dr. Hastings, was purified pyroxilic spirit, and not acetone, or pyroacetic spirit.

Mr. Morson had no doubt that pyroxilic spirit, and not acetone, was what Dr. Hastings referred to under the name naphtha. It was much to be regretted, that the term *naphtha* had been used to designate this liquid, as it was a very indefinite term. He would suggest the substitution of the term "wood spirit." It was not all specimens of wood spirit, however, that could be used medicinally in the cases alluded to. Most of the wood spirit of commerce was very impure, and required a particular process of purification to render it fit for medicinal use. It might be purified by largely diluting it with water, when an oily substance separates, after the removal of which, the spirit may be recovered by distillation.—*Pharmaceutical Journal*, April, 1850.

ART. LXXX.—POISONING BY HYDROCYANIC ACID, AND BY OIL OF CINNAMON.

Dr. Christison relates, in the *Monthly Jour. of Med. Sci.* (Feb. 1850,) a case of poisoning by hydrocyanic acid which is interesting from leading to the following practical deductions.

1. It renders it highly probable that a grain and a half

of radical hydrocyanic acid is adequate to produce death in the human subject.

2. That death may be caused by hydrocyanic acid without any odor of it being remarked in the breath, or in the first fluid withdrawn from the stomach, even although the odor be carefully sought for, and although the poison be present.

3. The notion entertained by various writers in the London journals, on the occasion of the trial of Tawell, that it is an invariable circumstance, that a piercing cry ushers in the action of a poisonous dose of hydrocyanic acid, is evidently erroneous, and founded on limited experience.

4. That the cold douche on the head is an energetic remedy, when other means available in so urgent an emergency are inefficacious.

M. G. C. Mitscherlich, from his experiments on animals, gives the following facts and conclusions :—1. That oil of cinnamon is a poison. Six drachms killed a moderate-sized dog in five hours ; and two drachms, in forty hours. One drachm induced illness of several days' duration. That it is a weaker poison than oil of mustard or savine, and stronger than oil of fennel, citron, turpentine, or copaiba balsam. 2. That oil of cinnamon is absorbed, is shown by the distinct odor of the oil in the abdominal cavity after death, and also, though to a smaller degree, in the blood. 3. Given in large doses, it can be detected by its aromatic odor in the deep yellow scanty urine ; and its odor can be perceived somewhat less distinctly in the breath expired. 4. The oil of cinnamon produces somewhat similar changes of structure in the stomach and intestines as the oil before mentioned. In the mouth, effusion of blood and vesication of the mucus membrane, without pre-existing inflammation. In one case there was a portion of the mucous membrane of the larger curvature of the stomach, one inch long and half an inch broad, which was of a gray color,

through which the muscular coat appeared; the adjoining muscular membrane was inflamed. This surrounding inflammation extended for some distance around, and gradually passed into the natural color. The nature of this change the author could not determine. In the small intestines the epithelium was found removed, and they contained only mucus. Besides these, the blood was found dark and slightly coagulated. The kidneys in their cortical substance, and the liver, were congested. 5. The most frequent symptoms of poisoning were—increase of the heart's impulse, slightly accelerated breathing, restlessness, evacuation of the contents of the larger intestines, no increase of the urinary excretion, muscular debility with loss of sensibility, loss of the frequency and strength of the heart's action, slow and difficult breathing, coldness of the extremities, and death without convulsions. The phenomena during life are clearly attributable to the absorption of the oil, as the appearances discovered after death are not sufficient to account for the fatal effects. In a few cases where the dose is not fatal, the same symptoms in a less degree were observed, and were followed by obstinate costiveness. —*London Med. Gaz.*, Nov. 1849, *from Preuissische Vereinszeitung*, No. 26, *and Hays' Journal.*

ART. LXXXI.—METHOD OF DEPRIVING QUININE OF ITS BITTERNESS.

By Richard H. Thomas, M. D., of Baltimore.

Baltimore, 2d mo. 15th, 1850.

To Dr. Isaac Hays:

Dear Doctor—Believing that I have discovered a method, by which quinine may be quite deprived of its great bitterness, without injuring its virtues in the least, I

take this method of making it known to the profession. Perhaps I may be anticipated; but if it be so, I am not aware of it.

In 8th month (August last,) having occasion to prescribe for a little patient, who was affected both with diarrhœa and intermittent fever, I ordered a combination of quinine and tannic acid. The child took it so readily that I tasted it, and was surprised to discover no taste of quinine; which I at once attributed to the combination.

I have since prescribed it in a number of instances, and found that while it was equally effectual, it was far more palatable than any other combination of quinine I was acquainted with. On referring to the *American Journal of the Medical Sciences*, Vol. xix. p. 219 (1836,) it will be found that Dr. Ronander, Secretary of the Swedish Medical Association, recommended, in 1834, the tannate of quinine and cinchonin as the most active ingredients of the Peruvian bark; he asserts that he has cured by their means several cases of obstinate ague, which had resisted the use of sulphate of quinine, and other powerful remedies, &c., &c. Nothing is said in the extract, from the original paper in *Hecker's Annals*, Dec'r, 1834, of the taste of the tannate of quinine. Compared with the sulphate it is almost tasteless.

The following is the extemperaneous prescription I am in the habit of ordering for a child two years old: R. Quiniæ sulph. gr. x; acid. tannici gr. ij; aqua ʒvj; syrup aurant. ʒij. M. A teaspoonful every hour or two.

I enclose a note on the subject from one of our most intelligent and careful apothecaries.

Baltimore, February 6th, 1850.

Dear Sir—I find, after trying a number of times combinations of quiniæ sulphas and acidi tannici in different proportions, that ten grains may be deprived of its bitterness in a great degree, by the addition of one grain and a half of tannic acid. I think this is a proper proportion.

Respectfully, James V. D. Stewart

Dr. R. H. Thomas.

ART. LXXXII.—SOME ACCOUNT OF THE VEGETABLE IVORY PALM. (*Phytelephas macrocarpa.*)

By Sir W. J. Hooker.

[The following interesting notice, taken from the Pharmaceutical Journal for February, has been considerably abridged, those portions of a purely botanical interest being left out, together with two wood-cuts illustrative of the plant and its products.—Editor.]

It is not for the first time we here make the observation that the vegetable products, best known in commerce, in the arts, &c., are frequently the least known *botanically*. A striking example in proof of this statement may be found in the fact, that familiar as every one is with the substance called *Vegatable Ivory*, Dr. Von Martius is obliged to bring to a conclusion his *Opus Magnificum* on the Palms, without being able to figure, or even to describe from the life or from well-dried specimens, *the* species which yields this singular substance. The very last genus noticed in the work just mentioned, is *Phytelephas*, and the author concludes his account of it with the remark: "Descriptio ex iconibus Gaudichaudianis et exemplari manco;" and these figures of Gaudichaud (*Voyage de la Bonite*) only exhibit the fructification, unaccompanied by any history or explanation.

We are far from expecting to fill up all that is wanting to the history of the *Vegetable Ivory*, our living plants are but young, and our own specimens, how superior soever they may be to those possessed by other botanical cabinets, are far indeed from being complete; for it is well known how difficult it is to procure available specimens for illustration of these "Princes" of the vegetable kingdom. The Royal Gardens, however, when sending out a collector to New Granada in 1845, did not fail to direct his attention to the

importation of this plant; so that living specimens may now be seen in our stoves, and well-preserved specimens in various, but not in all states, in one of the cases of the Museum. From these, and from other sources, our brief history will be derived.

The first notice of the existence of the *Vegetable Ivory Palm* was given by Ruiz and Pavon, in their *Systema Vegetabilium Floræ Peruvianæ et Chilensis*, published at Madrid, in 1798. There, under the name of *Phytelephas macrocarpa*, we find the following account of its native names and properties:—

"It is called *Pullipunta* and *Homero* by the Indians of the hot and low valleys of the Andes of Peru, about Chanchamoya, Vitor, Cuchero, and San Antonio de Playa grande, its native locality—*Palma del Marsil*, and *Marsil vegetal* by the Spaniards;—while the fruit, on account of its size and appearance, is called *Cabeza de Negro*. The Indians cover their cottages with the leaves of this most beautiful Palm. The fruit at first contains a clear insipid fluid, with which travellers allay their thirst; afterwards this same liquor becomes milky and sweet, and it changes its taste by degrees as it acquires solidity, till at last it is almost as hard as ivory. The liquor contained in the young fruits turns acid if they are cut from the tree and kept some time. From the kernel the Indians fashion the knobs of walking-sticks, the reels of spindles and little toys, which are whiter than ivory, and equally hard, if they are not put under water; and if they are, they become white and hard when dried again. Bears devour the young fruit with avidity."

This species, *P. macrocarpa*, is characterized by having a "short caudex and very large heads of fruit," which distinguish it from a second supposed species "destitute of caudex and with small fruit," *P. microcarpa* possessing the same native names and properties.

Humboldt next detected the palm in New Granada, especially common on the banks of the Magdalena, where it is

known by the name of *Tagua*, and where, he tells us, "buttons are made from the hard bony perisperm of the seed." Gaudichaud, in the still unfinished Partie Botanique of the *Voyage de la Bonite*, devotes three plates to the illustration of the flowers and fruit of what he deems several species of *Phytelephas* of Peru and Columbia; but being, as we have already observed, unaccompanied by any observations, we are ignorant on what grounds he rests his distinctive characters.

At what period these seeds or "*nuts*" were first brought to England to be used by turners, &c., we have no means of ascertaining, nor to what extent they are now imported. MacCulloch, in his *Dictionary of Commerce*, and Dr. Ure, in his *Dictionary of Arts, Manufactures, &c.*, are alike silent. But from the use that is made of them, the amount is probably considerable, and in the turners' and toy-shops of London may be purchased, for a shilling each, the nuts, or more properly speaking the seeds, either entire, or with one-half of the coat removed by turning, so as to exhibit the beautiful ivory-like texture of the interior. The *entire* seeds thus purchased had been planted in our garden; but they had never been made to germinate. Hence, all due instructions were given to Mr. Purdie when he was sent on his botanical mission, some account of which is published in the *Companion to the Botanical Magazine*, and in relation to the *Phytelephas* or *Tagua* in particular, in the volume for 1847. We there earn that the palm inhabits dense shady woods on hills facing the Magdalena, in the province of Ocana, at an elevation of 1,000 to 3,300 feet above the level of the sea; never growing in hot plains or level country. At the season when the flowering takes place, the country is said to be scented with its fragrance, and when the fruit is advanced, all wild animals, especially hogs and turkeys, are extremely fond of it. "Enclosing the seeds," observes Mr. Purdie, "is a yellow sweet oily pulp, which is collected at the proper season (October) and sold, under the name of *Pepe del Ta-*

gua, for one real a pound, at Ocana. A spoonful of it, with a little sugar and water, makes the celebrated *Chique de Tagua*, said to be the most delicious beverage of the country."

The fruit of the *Phytelephas* will be considered of more interest by our readers than the flowers. The size of our large fruits is ten inches across, and twenty-five in circumference: they appear at the base of the leaves on very short stalks, the great heads (*Cabeza de Negro*, like Negroes' heads, whence that name) resting on the ground, or lodged among the axils of the foliage, constituting a dry Drupe; that is, the covering to the seeds in an early stage is soft, fluid, or pulpy, but eventually dries up into a hard, almost woody mass, 3—4 or 5-lobed, and everywhere embossed with conical, angular tubercles, something like the coat of a pine-apple. These tubercles, however, vary remarkably in size and length, giving an impression that there are several species of the genus. Within each lobe are several (the number would appear very uncertain) large, hard, smooth, oval, or obovate, or almost spherical seeds, of a greyish-brown color, sometimes with the sides flattened by pressure, sometimes depressed. In this state they are sent to Europe, for it is they which contain the ivory-like substance. The outer coat, hard and crustaceous, is easily removed, when a thin brown skin appears, marked with anastomosing vessels, and distinguished by a hole or foramen, indicating the position of the embryo. Within this skin, the whole is occupied from the centre to the circumference, with the exception of the small embryo, by the albumen, the food of the young plant, analogous to the white of an egg; and the albumen (which, in the cocoanut is soft and fleshy and eatable) is here firm and hard, in appearance exactly resembling ivory, hence employed by the mechanics, as far as the size will allow, for various purposes in turning, &c., as a substitute for ivory, a much more expensive article. What is wanting in size, however, is often made up by the skill and ingenuity of the workman: when

an article is turned it easily permits of pieces being added to it without the blemish being exposed to view; and where a lid is required for a box of vegetable ivory, a separate seed is used for the lid.

Thus we have another, among many instances, of a vegetable product so nearly resembling, and exactly resembling to the eye, an animal substance (and that of a very distinct yet familiar character) as to be frequently passed off for such; and the generic name, *Phytelephas*, (Ruiz and Pavon,) will thus be found to be very appropriate, being derived from φυτον, a *plant*, and ελεφας, an *elephant*, for as the elephant is the ivory-bearing animal, so the *Tagua* is the ivory-bearing plant. Much, however, as the albumen of the seed of the *Phytelephas* resembles animal ivory at the first glance, its internal organization is extremely different, as may be expected. That of the seed of Palms, generally, has been admirably illustrated with figures and descriptions by Hugo Mohl; but that of the plant under consideration has especially occupied the attention of Professor Morren, of Brussels, in the second part of the first volume of *Dodonæa, ou Recueil d'Observations de Botanique*, p. 74, from which we give the following extract, and we must refer to the plate itself of that work (Tab. II.) for the highly magnified appearance of this beautiful and curious structure, and to the several figures to which reference is frequently made:—

"The external covering of the ivory-nut (seed) is so hard as to be almost stony, yellowish-grey, smooth, and destitute of gloss; it is attached to a second coating, which is brown, porous, and dull, and is incorporated with it. Beneath a hollow, which separates these two integuments, is a third, brown, veined, warted and glossy covering, traversed by numerous fibres, under which lies the albumen which forms the vegetable ivory. The vegetable ivory is of the purest white, and free from veins, dots, or vessels of any kind, presenting a perfect uniformity of texture, surpassing the finest animal ivory; and its substance is everywhere so hard, that the slightest streaks

from the turning-lathe are observable, and cannot be erased till it is newly fashioned.

"When the article is carved, the vegetable ivory may be known by its brightness, and by its fatty appearance, whereon the well-skilled may discern the minute lines which are the beds of cells. Its structure would almost seem to show more analogy with bone than with ivory; but a microscopic investigation quickly proves that vegetable ivory possesses an entirely different structure."—*Hooker's Journal of Botany.*

ART. LXXXIII.—ON OIL OF THYME, COMMONLY SOLD AS OIL OF ORIGANUM.

By Daniel Hanbury.

The vast number of plants included in the botanical order of Labiatæ, and the very close alliance of many, render it not surprising that the history of their essential oils should in a few instances be involved in a degree of confusion or doubt. Nor is this the less to be wondered at, when we reflect on the great similarity of many of these oils, our imperfect means of distinguishing them and of ascertaining their purity, the unavoidable alteration produced on some by extraction, to say nothing of differences arising from locality, or from want of care in conducting the process of distillation.

The essential oil which I propose to submit to notice at this time, is not one of importance to medicine; yet having had the opportunity of visiting the district where it is obtained, I have elicited a few facts regarding it which appear sufficiently interesting to be laid before the Pharmaceutical Society.

The volatile oil sold by chemists as *Oleum origani* is often popularly, and almost always commercially, termed *Oil of*

Thyme. Writers on Materia Medica generally mention the latter name as an *incorrect* appellation of the true *oleum origani vulgaris*, a statement, the converse of which I believe to be by far more usually the case.

During a visit to the South of France in the autumn of last year, I procured from the manufacturer a sample of an essential oil of thyme, as well as a specimen of the plant from which it was distilled. This oil, which was submitted to Dr. Pereira, proved to be identical with the "*oleum origani*" of English druggists; and the plant, which was kindly examined by Dr. Lindley and G. Benthem, has been ascertained to be *Thymus vulgaris*. The latter gentleman in a note to me states, that the plant in question is "the true *Thymus vulgaris*, so abundant on the arid wastes of Lower Languedoc as to be much used with rosemary and lavender for fuel."

Thymus vulgaris, the common thyme of the gardens, is collected from the rocky hills in the department of Gard in the South of France, and the entire plant is submitted to distillation with water. The oil, which is of a reddish-brown color, is called *Huile rouge de Thym.* Redistillation renders it colorless, and it is then termed *Huile blanche de Thym.* The colored oil, however, is that most commonly sold.

The trade of distilling oils of thyme, lavender, rosemary, &c., is chiefly in the hands of small manufacturers at Milhaud, Aujargues, Souvignargues, and other villages in the vicinity of Nismes. From the makers, the oils are purchased by the merchants in the neighboring towns, and thence exported to distant parts.

The question naturally arises,—is all the "*oleum origani*" used in this country thus derived? I believe it to be so. I have not been able to discover that any is manufactured here, nor have I succeeded in procuring a sample so essentially differing from oil of thyme, as to warrant my believing it to be genuine oil of origanum. The extremely low price at which oil of thyme can be produced in the South of

France, and the common purposes to which it is applied, seem to preclude all attempt at competition in other localities. Cheap, however, as it is, it is yet occasionally the subject of adulteration with oil of turpentine, whose odor in such case may be readily detected, especially on comparison with a good sample.

That the consumption of oil of thyme in this country is considerable, may be gathered from the following extract from "*An Expository Statement of the Consumption of imported Commodities within the United Kingdom in two years preceding and in two years following the establishment of the New Tariff, presented to both Houses of Parliament, by command of Her Majesty*, 1845."

OIL OF THYME.

Quantities retained for Home Consumption.			
Years ending 5th January.		Years ending 5th July.	
1839.	1841.	1843.	1844.
11,938 lb.	8,818 lb.	7,991 lb.	7,553 lb.

Although the duty under the new tariff was reduced from 1*s.* 4*d.* to 1*s.* per lb., the consumption declined. Whether it has continued so to do, it is not easy to ascertain, as no official return similar to that above quoted has since been published.—*Pharmaceutical Journal*, July, 1850.

REVIEW.

ART. LXXXIV.—THE ENCYCLOPEDIA OF CHEMISTRY, Practical and Theoretical: embracing its application to the Arts, Metallurgy, Mineralogy, Geology, Medicine, and Pharmacy. By JAMES C. BOOTH, A. M., M. A. P. S., Melter and Refiner in the U. S. Mint, Professor of Applied Chemistry in the Franklin Institute. Assisted by CAMPBELL MORFIT, Author of "Applied Chemistry," and "Chemical Manipulations." Second Edition. 1 vol., royal 8vo. pp. 974. Philadelphia: Henry C. Baird, successor to E. L. Carey. 1850.

So many treatises on Chemistry and its branches have been presented to the public within the last few years, and so varied have been their pretensions and their merits, that the student of this interesting science would find it a puzzling task to form any accurate idea as to which of the competitors for his notice would most profitably repay perusal, or would best elucidate the particular subjects of his investigation. In the "Encyclopedia" just published by Mr. Baird, we have a new aspirant for popular favor, or rather an improved and enlarged presentation of a work which has already met with a favorable reception from the public; and though but a hasty and superficial glance at its deserts is designed at present, it is hoped that even such an imperfect sketch may serve in some slight degree to assist or guide the judgment of the inquirer.

In its general plan, it is obviously modeled on the Dictionary of Chemistry of Dr. Ure, though, as the author has correctly remarked in his preface, "the science has so entirely changed its features, as to render that work of no avail; nothing has in consequence been taken from it." Indeed, throughout the volume there is exhibited the result of diligent and laborious comparison, and occasionally the traces of original research; and though such a production must of course necessarily be chiefly a compilation, it is evident that Mr. Booth and his coadjutors, Dr. Boyé and Mr. Morfit,

have exerted themselves to render the Encyclopedia a new as well as full treatise on Chemistry.

The alphabetical arrangement of subjects characteristic of an Encyclopedia has, as applied to this science, both peculiar advantages and disadvantages; but it is probable that for a work of popular character, and one destined for a comparatively extended circulation, the latter far outweigh the former. If much of the system of the subject is by this means sacrificed, and much of the beautiful relations and dependencies between the different departments, and the varying reactions of this extensive branch of knowledge, overlooked, which contribute so much to its unity, simplicity, and precision, and indeed constitute chiefly its claims to the character of a science, there is gained on the other hand the great convenience of a classification best adapted to facilitate a ready reference,—a desideratum occasionally of no slight advantage even to the professional adept, and of invaluable utility to the student and the tyro. Besides which, this mode of arrangement seems best adapted to receive the additions or modifications continually rendered necessary by the never-resting advance of chemical discovery, and to permit their incorporation in the work with least violence to its previous order or general character.

In looking over this work, there seemed to us a striking deficiency in its plan—in the absence of an introductory chapter, giving a general view of the subject detailed in its pages. Considering the necessarily isolated nature of its disquisitions, it is almost an essential that it should open with a brief treatise, comprising a concise account of the objects, province, and limits of the science, a history of its progress, including a sketch of the more important discoveries which have constituted its epochs; and finally a notice of the barriers which seem to stand in the way of its more abstruse researches, and incidentally thereto, a review of the more striking *mirabilia* which present themselves to the chemical student to startle and delight only to dissatisfy and bewilder

Such an essay, while it would possess an exceeding interest to the general reader, would form the very best preparation for, and introduction to, the expositions which should follow. The short article on the subject which is given in the body of the work, is not only too scanty and incomplete, but scarcely seems to occupy a proper place amid a series of topics, *all* of which are assumed to be its subordinates.

From the nature of such a publication,—the joint production of various pens,—and from the different degrees of attention naturally bestowed on different parts, it is not surprising that there should be considerable inequality in the performance; but there will be found occasional inaccuracies of expression or construction, which mar the elegance, and sometimes the perspicuity, of the composition. This is no doubt owing to the hurry almost unavoidably attendant upon the preparation of so voluminous a book for the press.

It is perhaps scarcely worthy of note, that several chemical terms have been omitted, which we should have expected would have found a place in the "Encyclopedia;" while others are occasionally met with, scarcely connected with the science or the practice of Chemistry.

It would have formed a very interesting paragraph under the head of "Synthesis"—after noticing the very slight advance as yet made in this department of chemical science, in comparison to that made in analysis, and remarking upon the difficulties which beset the subject, together with some of their probable causes—to have enumerated the more important attempts which have been made at different times by philosophers to reconstruct the familiar materials which Nature so readily obtains in prosecuting her wondrous mechanisms, and to have exhibited in detail the few instances wherein they have been successful in obtaining organic products by combining their elements. The difficulties which surround this most curious branch of scientific inquiry will be partially illustrated by the simple yet puzzling phenomenon of *isomerism*. When we turn, for instance, to the word "Hy-

drogen" in the Encyclopedia, and find there given a list of *ten* different proximate principles or other substances, distinctly marked and separately recognised, each one composed of the same two elements, in exactly the same proportions—namely, of Carbon and Hydrogen in equal quantities; or when we discover in the table of "Essential Oils" at least *thirteen* of the series varying greatly in their external properties, yet all composed of the same two elements, in the uniform proportion of 4 equivalents of the former to 5 of the latter, we may form some idea of the variety of unknown circumstances necessary to determine that a combination of these constituents in the proper quantities shall certainly result in any one of these substances rather than in any other of the series. And yet who shall venture to pronounce that in the illimitable progress of chemical science, man shall not also attain to this high triumph of chemical art?

We have noticed, once or twice, that the formulæ for chemical compounds given in the Encyclopedia differ slightly from those of some of our other authors; which is no doubt the result of a discrepancy in the analysts from whom the statements are received. It would perhaps have increased the scientific value of this compendium, to have presented, in all such cases, the authorities for the proportions adopted.

Having thus freely, though cursorily, alluded to what appear to us the slight deficiencies of Mr. Booth's work, it would be exceedingly unjust to its authors, not to express in much stronger terms our sense of its many merits and general excellence. Almost every subject connected with Chemistry is treated of in a concise and generally very perspicuous manner; and we are thus furnished with a mass of information upon the science which could be obtained from no other single volume. The production of such a book has evidently demanded the most assiduous and laborious application from those engaged in it, and the result may well afford them gratification. The Encyclopedia is enriched throughout with a large amount of appropriate statistics,

collected in the form of tables; and, under the subject "Analysis" we have presented to us a most valuable chart of this kind, exhibiting all the more ordinary combinations of each of the elementary substances, and furnishing the means of determining, from the ascertained amount of any such product, the required amount of the element entering into its composition.

In the department of Mineralogy, we are pleased to find that Mr. Booth has bestowed a share of attention due to the importance of the subject; illustrating, with tolerable fullness, a branch of the science which has been too generally neglected by our writers of chemical treatises.

In all the branches, there appears to have been incorporated into the work the results of the more recent investigations and discoveries, thus making it a complete exposition of the present state of chemical science; so that the student who, with a good elementary treatise, shall possess himself of the Encyclopedia, may consider himself furnished with the grammar and dictionary of this province of knowledge.

The article on "Electricity," by Prof. M'Culloh, is a very complete and able essay on that subject, and, if published separately, would form a most interesting and valuable pamphlet.

On the whole, we have formed a high opinion of the value of the book, and would recommend all desirous of placing in their bookcases a comprehensive survey of chemical science for reference, to provide themselves with the "Encyclopedia of Chemistry" of Mr. Booth.

Before closing, we should notice the minor, though by no means unimportant, subject of its external appearance. The book has been got up in a very neat and substantial library style, handsomely illustrated with wood-cuts, together with a series of engraved plates at the close of the volume. Its general appearance is highly creditable to its enterprising publisher, and we have no doubt it will meet with a sale proportioned to its merits. A. B. T.

VARIETIES.

On the Concentration of Sulphuric Acid in Cast-iron Pots. By Mr. Roder, Apothecary.—The platina stills used in large oil of vitriol manufactories are very costly, and the glass retorts, which were formerly employed for concentrating the so-called pan-sulphuric acid, are easily broken and inconvenient. Mr. Roder, apothecary, tried therefore cast-iron enamelled pots, and satisfied himself that the enamel was not at all destroyed by boiling sulphuric acid. It is well known that enamelled vessels suffer much, if the contents are evaporated to dryness; with liquids, however, even if they be strong acids, this is not the case, supposing that the enamel is very good, and properly fused.

The enamel of the cast-iron pots employed by *Roder* was prepared in the following manner:—1 part burnt alum, 4 parts red lead, 2 parts siliceous earth are ground as finely as possible, mixed together, and then fused till the mass flows gently; it is then plunged in water and again pulverized.

Of this powder, fifteen parts are triturated as finely as possible with twenty parts of siliceous earth, and three parts of tin-ash or oxide of tin, then rubbed down with oil of turpentine, and applied by means of a soft brush to the interior surface of a carefully polished and smoothly turned cast-iron pot; the operation is repeated three or four times, but not before the preceding coating has become perfectly dry. Pots with flat circular bottoms are the best for this purpose. The mode of fusing the enamel is known.

With regard to the concentration of the pan-sulphuric acid in these pots on a large scale, the best plan will be to have a heating-apparatus for four pots, each for two or three hundred-weight of acid. Larger pots would considerably in-

crease the expense, whilst, by four or six such heating apparatus, with which sixteen to twenty-four pots can be constantly kept in operation, larger quantities can at once be concentrated than have ever been concentrated in the largest platina still, and that at only the sixth or eighth part of the cost, not reckoning the expensive repairs which a platinum still requires from time to time.—*Pharm Jour.*, Feb., 1850.

Solubility of Iodine in Cod-Liver Oil. By FLEISCHMANN.—In order to discover in what proportion iodine is soluble in the fatty oils, Fleischmann rubbed down one and a half gr. of iodine with a few drops of *ol. jecoris aselli album*, and found that it soon dissolved. The oil at first assumed a dirty brown color; but upon the addition of five ounces more oil, this color disappeared, and no difference could be observed between the pure oil and this mixture.—*Pharm. Jour., from Buchner's Repertorium*, 1849, No. 11.

White Enamel for cementing Earthenware and Glass.—Four parts of red lead, two parts of white sand, and three parts of crystallized boracic acid are to be finely powdered, washed, mixed, and fused in a Hessian crucible. The mass is then poured on a sheet of metal and finely triturated. The powder is applied with mucilage of tragacanth to the broken pieces, which are then joined and heated in the muffle, but only to such a temperature that the enamel binds them firmly together, without completely fusing.—*Pharm. Jour., from Pharm. Central Blatt*, 1850, No. 13.

Editorial Department.

Our Journal.—This number concludes the twenty-second volume. It is intended, in commencing the next, to adopt some means by which an increase in the quantity of matter can be effected, without materially altering the appearance of the work. It would be gratifying to us if the Journal could be made more practically useful to the pharmaceutists of this country, by their making it a medium of communication with each other on subjects appertaining to their profession. The name of the Journal should give it a general character, and there is every disposition on the part of the Editor and Publishing Committee to act with strict impartiality in reference to every sectional interest.

We have long been solicited to attach an advertising sheet to the Journal, but chiefly owing to the difficulty of drawing the line between the objectionable and the proper, it has been deferred from time to time. We now propose to append such a sheet, to each number, reserving to ourselves the full and entire right to decide on the admissibleness of the advertisements, so as not to compromise the principle which has heretofore characterized the work, of opposition to empyricism. New pharmaceutical preparations, the composition of which is not secret; business notices; book notices, etc., will be inserted, but nothing that can properly be considered as quackery will be admitted.

It may be well to state in explanation, that we draw a distinction between a reservation of the skill and manipulations required in the preparation of a medicine, and a reservation of its composition. The most fastidious member of the College of Physicians may use Henry's magnesia without implicating his character as an opponent of quackery, because he knows what he prescribes as well as if he had witnessed its preparation, and any chemist can assure himself of its nature; but it is far different with a panacea, a vermifuge, or other complex mixture, which offers to effect wonderful results, and which appeals to the faith, and not to the judgment of the practitioner and consumer.

"*Fatal effects from the carelessness of an Apothecary.*"—Under this heading we find the following article in the *Boston Medical and Surgical Journal* for August 7th, viz.:

As mentioned briefly in last week's Journal, an accident of a very serious nature recently occurred in this city. An apothecary, Mr. Wakefield,

mistaking the article in the physician's prescription, put up for chloride hydrargyri, the bi-chloride, and thereby, as it is reported, caused the death of Mr. James Hall, who took it. We cannot conceive how such an error could have occurred with any kind of carefulness on the part of the apothecary. Bottles may be misplaced, yet that would not afford an excuse; or even the bi-chloride may have been in the wrong bottle, which is still more reprehensible. The fact is, many of our apothecaries are not sufficiently educated, and not careful enough in compounding and dispensing medicines. Too much limit is allowed the apprentice in dealing with articles of such potency. It has often been advocated in the pages of this Journal, that the sale of such potent chemicals should be regulated by law; and further, that the apothecary should receive a medical education, and be duly qualified before entering upon his very responsible office. As the law now exists, any one can set himself up as an apothecary, even if he cannot tell buchu from senna leaves. In a future number we shall have something further to say on this subject.

In the case referred to, upon the verdict rendered by the jury of inquest, who investigated the circumstances attending the death of Mr. Hall, Mr. Coroner Smith entered a complaint in the Police Court against Mr. Wakefield, the apothecary, charging him with manslaughter. Mr. Wakefield was arrested, and brought before Justice Merrill, when, waiving an examination, he was required to furnish bail in $5000 for his appearance at the ensuing term of the Municipal Court for trial on the charge made against him.

We have seen no account of this fatal mistake except the above, and do not know under what circumstances it occurred; whether the apothecary was solely to blame or not—whether the error arose from the ignorance of himself or his apprentice, or whether the physician, by the improper use of terms, may not in some measure have been instrumental in bringing about the casualty. We may safely say that there are none more strict in enforcing the obligations and responsibility of the apothecary to the medical profession and the public than ourselves: we hold that in every instance he should, before compounding a prescription, feel assured, as far as the circumstances of the case will admit, that what is written is the true expression of the physician's wishes, and does not embrace an error of inadvertence or of ignorance; for we do not have to go beyond this city to show that there are members of the medical profession grossly ignorant of the pharmaceutical and chemical relations of the drugs and medicines they prescribe. We admit, without hesitation, that even in this city, where the means of pharmaceutical education are greater and have existed longer than elsewhere in the Union, a number of unqualified persons are engaged in the apothecary's business, and will continue, until some legal restraint shall be enforced to compel the proper qualification,—yet we believe, in many instances where errors have occurred in compounding prescriptions, some blame should attach to the physician, either for imperfect chirography, or by the use of terms,

not officinal, often obsolete synonyms, which create doubt and cause trouble where a proper language would be easily understood. We will instance the present case. It appears that the prescription called for *chloride of mercury*, (hydrargyri chloridum,) and the apothecary put up *bichloride of mercury*, (hydrargyri bichloridum.) Now neither of these terms are the officinal designations of our own Pharmacopœia for calomel or corrosive sublimate, but they are those of the *London* code. By reference to Graham's and Kane's chemistrys, both standard British chemical authorities, he will find *corrosive sublimate* described under the terms *chloride of mercury*, and calomel as *sub-chloride of mercury*. Without designing in the smallest degree to justify it, how easily might these chemical and pharmacopœial names be confounded through a careless inadvertence? It was in view of the constant and often necessary changes in chemical nomenclature, as that science progresses, that the framers of our Pharmacopœia adopted a language for these important preparations, which no probable change in chemical opinions would affect, viz., *mild* chloride of mercury for calomel, and *corrosive* chloride of mercury for corrosive sublimate. If physicians would conscientiously agree to employ the language of their national code, and carry it out in practice, we would hear of fewer errors of this kind. In Philadelphia, calomel is prescribed under the terms, "Hydrargyri chloridum mite," "Hydrargyri chloridum," "Hydrargyri proto-chloridum," "Hydrargyri sub-murias," "Hydrargyri murias mitis," "Hydrargyri murias dulcis," Calomelas," "Calomelas præparata," not to speak of the numerous modes of abbreviation and the scandalous handwriting in which the prescriptions are often couched.

The views of our Boston cotemporary in regard to the entrustment of prescriptions to unqualified apprentices and assistants; the necessity there exists for legal enactments respecting poisons; and the yet stronger necessity there is for more attention to the education of pharmaceutists; agree perfectly with our own. In the United States, pharmacy is virtually unprotected in sight of the laws—is a mere trade or business—which any one may practice who has the money to commence and the assurance to prosecute it with the most meagre smattering of its language and materials. Whilst such is the case, how can it be expected that young men of ability will pass through a tedious course of practice, and study to qualify themselves as competitors to a host of pretenders, whilst a large portion of the public make no distinction between them save that which arises from a false economy? In fact there are few stores of the hundreds in this city, the revenues of which are sufficient to pay a qualified assistant as he deserves;

hence the custom of depending on apprentices. There is no real objection to this, if a proper system is followed, so that of two apprentices one will always be sufficiently advanced to act as a responsible assistant in the absence of his employer. The latter therefore is bound to exercise his best judgment in admitting youths to his establishment, to keep a conscientious watchfulness over their conduct whilst engaged in their duties, and to afford them every facility of advice, and books whereby they may acquire a rapid and correct knowledg of their profession. We have been pained repeatedly in our intercourse with the Pharmaceutical students of this city to learn how culpably negligent in some instances their employers have been in furnishing the means for study. It is the pecuniary interest of every pharmaceutist to render the inducement to study and intellectual culture strong, to his apprentices. Their increase of knowledge reacts in his favor, they are better satisfied with the necessary but onerous confinement they are subjected to, and they are less disposed to devote their leisure hours to the pernicious literature of the day or the sensual enjoyments too freely attainable in a large city, and which have lead many promising lads and young men from the path of rectitude, and plunged them into the vortex of dissipation, based on means dishonestly obtained from their employers. In so speaking we know that it is the truth. We have a strong sympathy with the young and rising members of the pharmaceutical body; we understand their difficulties and trials, imaginary and real; and we would encourage them to aim at a high standard of qualifications, and let no ordinary impediment, or short-lived temptation, prevent them from attaining to it. They will find the character thus gained a more substantial and valuable capital, when they arrive at manhood, than twice the amount necessary to stock a store. With such qualifications young men find no difficulty in getting situations, in which we frequently see them advanced till they become the principals.

Apparatus for making Tinctures.—In Mohr and Redwood's Pharmacy, p. 567, a method of making tinctures is described, as suggested by Dr. Burton of London, which consists in suspending the ingredients, enclosed in a coarse bag, in the menstruum near its surface. The principle of circulatory displacement then comes into play viz., Solutions of solid bodies are generally heavier than the liquids by which they are made, and consequently when a soluble substance is suspended in a solvent, a downward current of solution and an upward current of menstruum is established, which continues until the whole liquid is equally saturated or until the substance is dissolved. The difficulty of procuring stoppered bottles with mouths sufficiently large to admit

of the introduction of the ingredients in the bag has been an objection to this method. Mr. Samuel Gale, in the April number of the Pharmaceutical Journal, proposes a cylindrical brown stone-ware vessel, with a movable diaphragm capable of being supported at different heights in the cylinder by projecting brackets, which corresponding notches in the edges of the diaphragm enables it to pass to the position required, when by turning a little its edges will rest on the brackets. The object of having several ranges of brackets is to be able to make different quantities of tincture in the same vessel. This method of making tinctures has many advantages over simple maceration; among the most prominent of which are, shorter time, the avoidance of agitation, absolutely necessary in the old plan, and the fact that the upper stratum of menstruum, in contact with the ingredients, is always the least saturated, and hence has more solvent power.

Exhibition of Industry of all Nations, to be held in London in 1851.—There is perhaps no branch of human industry that will not be represented at the great Fair of 1851. Among these, chemical products used in medicine and the arts, both inorganic and organic, are included. We presume that among the contributions from the United States this class of productions will not be overlooked. Some of our Chemical manufacturers produce articles every way equal to the best similar articles of European origin, and they should feel a laudable ambition to stand well in this department on that occasion.

The following is a sketch of the four great sections of the articles to be exhibited; to give the sub-sections as contained in the Commissioners' announcement, would require ten of our pages.

Section I. Raw materials and produce—illustrative of the national productions on which human industry is employed.

Section II. Machinery for Agriculture, Manufacturing, Engineering, and other purposes, and Mechanical Inventions—illustrative of the agents which human ingenuity brings to bear upon the products of nature.

Section III. Manufactures—illustrative of the result produced by the operation of human industry upon natural produce.

Section IV. Sculpture, Models, and the Plastic Art generally—illustrative of the taste and skill displayed in such applications of human industry.

The first Section, under the heads of substances derived from the mineral, vegetable, and animal kingdoms, comprehends nearly all substances applicable to medicine and pharmacy.

The Commissioners will be ready to receive deposits from the 1st of January to 1st of March inclusive, after which date none will be re-

ceived. The foreign deposits (those from this country for instance) will not be charged with duty, and will be received through the custom-houses at London, Liverpool, Bristol, Hull, Newcastle, Dover, Folkestone and Southampton.

The exhibitors pay all expenses until the articles are deposited, but none after till the exhibition closes, when they may remove them from the country, or sell them, in which case the duties must be paid.

The Exhibition will open on the 1st of May and continue open for six months.

TILDEN'S EXTRACT OF CONIUM.—In our last number we gave the results of an examination of several of the extracts prepared in vacuo, by Tilden & Co., of New Lebanon, N. Y., with some suggestions calculated to improve their quality. Since then we have received from those gentlemen a bottle of Extract of Conium made in accordance with those suggestions.

The odor of this extract when opened is heavy and narcotic, reminding one of the bruised plant, though different; its color is dark brown without a trace of green, the chlorophylle having been removed; its consistence is nearly that proper for pills, adhesive and not pulpy like that before described. When triturated a short time with twice its weight of water, the whole is dissolved, except a small proportion of brown sediment. When mixed with an excess of potassa in solution, the odor of conia becomes strongly perceptible, with but little of the ammoniacal odor previously noticed in the green extract under the same treatment. When a strong solution of the extract, mixed with potassa, was distilled, the distillate consisted of a saturated solution of conia and some volatile oil, with numerous globules of the alkaloid floating on its surface. By a comparison with a similar experiment made two years ago with English extract of conium, the apparent yield was greater in this instance, which is probably due to the absence of the albumen and coloring matter in Tilden's, which increases its strength, admitting that the plants in each case possessed equal medicinal force.

In a pharmaceutical point of view, Messrs. Tilden & Co. have accomplished the object of their wishes, viz., a perfect vegetable extract in which the active principle of the plant is found in a concentrated form, unimpaired by the manipulation to which it has been subjected.

In reference to the therapeutic value of this extract, the brief time it has been in our possession does not justify any decided opinion. It is now in the hands of an experienced practitioner accustomed to observe closely the effects of medicines, and so far the results of the trials made are quite favorable to the quality of the extract. Our

chief interest in the success of the Messrs. Tilden's experiment, is not that it may prove a successful speculation, however favorable we may be to them in this regard; but it is that the question of the alleged deteriorating influence of our climate and soil on European narcotics, when grown here, may be fairly tested, and if not true, that our physicians may have the advantages arising from their home culture.

Calcined Magnesia.—Several attempts have been made in this city to produce a magnesia similar in qualities to that of the Henrys, of Manchester, Eng. Our attention has been called to the subject by the reception of a bottle of "Husband's" magnesia and one of "Ellis's" magnesia, from their manufacturers, Thomas J. Husband and Charles Ellis & Co. The former is known to the public, the latter is just being introduced. They are put up in bottles in shape like Henry's, with the maker's names on them.

We are sensible that it is no easy task to give a fair and correct judgment in such a case,; our opiuion will be drawn from a comparison of the following data: Density, suspensibility in water, readiness of solubility in dilute acids, absence of carbonic acid, absence of iron, loss of weight by heat, smoothness in a dry state, and smoothness when mixed with water.

The real density of the three specimens, as ascertained by weighing 100 grs. of each in a 1000 gr. bottle filled with ether, sp. grav. .740, was 3.333, but their apparent density was quite different, owing to the varying molecular condition of the magnesia. When equal weights are put into dry test tubes and shaken down equally, Henry's occupies the least space, Husband's rather more, and Ellis's considerably more. When an equal weight of each is mixed with fifteen times its weight of water in a test tube, and well shaken, Henry's settles the soonest, Husband's next and Ellis's last, and after standing half an hour, the relative space occupied by the three was Henry's 2, Husband's 3 and Ellis's 5. Ellis's being the least dense, is more readily suspended in water, and makes a more lasting mixture than either of the others.

When an equal quantity of muriatic acid is added to each test tube containing magnesia and distilled water, and shaken at the same moment, Ellis's dissolves the quickest, Husband's almost as soon, whilst Henry's requires twice the time of Ellis's. When a few particles of each magnesia is pressed on different parts of a piece of moist reddened litmus paper, quite neutral, and left for *a minute*, the blue color is fully restored by Ellis's and Husband's, whilst Henry's hardly changes the shade. When taken into the mouth there is a perceptible difference between the specimens. Henry's at once diffuses itself in the saliva without any other than the mechanical impression of the

powder, for some minutes, when the peculiar taste of magnesia is slowly perceived. Husband's gives the magnesian taste sooner than Henry's and more decidedly, but is quite smooth on the tongue. Ellis's gives the taste yet more distinctly, and is also smooth on the tongue. The greater taste in the two latter is due to their quicker solubility in the saliva. When 100 grains of each specimen was kept at a red heat for half an hour in a platina crucible, Husband's lost 7.5 grains, whilst Henry's and Ellis's lost but .7 of a grain. As neither gave evidence of containing carbonic acid when dissolved in muriatic acid, the loss is attributable to water, accidentally present in the two last, but designed in Husband's, which is therefore a sub-hydrate of magnesia. A few drops of solution of ferrocyanuret of potassium was added to each of the muriatic solutions of the magnesia; a perceptible blueness was evidenced by Henry's and Ellis's, but only a tinge of green by Husband's. After standing 24 hours they each deposited Prussian blue, Husband's but a trace, Henry's more, Ellis's most. The water and acid used were proved to be free from iron by a parallel experiment. When each magnesia is placed on a sheet of paper, and a smooth spatula drawn over it with pressure, Henry's is the smoothest and least inclined to adhere to the paper or knife, Husband's more adherent, and Ellis's decidedly more so. The particles of the first two have less inclination to cohere than Ellis's, and are in this respect more like precipitated chalk.

They all mix readily with water by mere agitation, but from the nature of the particles, Henry's mixes most readily, but separates the soonest, and Ellis's, as has been stated, remains longest in suspension.

In conclusion, it may be stated, that whilst Henry's magnesia is taken with less inconvenience from taste, Husband's and Ellis's, by reason of their more ready solubility, act more quickly, and probably more efficiently, weight for weight, and are better calculated for mixtures where suspensibility is an advantage.

Pharmaceutical Museum.—For some time past a committee of the Philadelphia College of Pharmacy have been engaged in carrying out a resolution of that body, appropriating certain funds to the commence- of a Museum, of Chemical, Botanical, Pharmaceutical and Materia Medica specimens. They have had cases made, furnished with glass-ware of sizes to suit the purposes of such a cabinet, and a large number of them have been filled with well selected specimens. As there are many of the Graduates of the Institution located in various parts of the United States, in positions where they can obtain objects of pharmaceutical interest, we hope they will remember their Alma Mater when they meet with specimens calculated to enrich its collection.